No. 4, 1983 Winter Solstice

the Seedhead News

We're TAX EXEMPT! . . . and Other Good News

Autumn, 1983 was a good time for Native Seeeds/SEARCH. By far the best news was receiving our non-profit, tax deductible (501-c-3) status from the Internal Revenue Service. Subsequently. we received outright grants or donations from the C.S. Fund, the Arizona Native Plant Society, the National Sunflower Association, and the Tribal Sovereignty Program. In addition, if through contributions from individuals (over and above annual memberships) and from other organizations, we can raise $2500 more this year, the C.S. Fund will match that. HELP US MEET THIS CHALLENGE.

These fortuitous events enable us to employ Mahina Drees, NS/S treasurer and native crop gardening expert, on a day-a-week basis, to provide more order and continuity to our efforts. Also, we can now go ahead with other seed collection, education and grow-out plans in which several people will be involved.

Our educational outreaches the last few months have included a new exhibit display at the Tucson Botanical Gardens, plus booths at the Arizona-Sonora Desert Museum's Harvest Bazaar, and at Tucson's Fourth Avenue Fair. Our entire board participated in a native foods extravaganza, including talks, songs, food demonstrations and discussion during Friends' Day at the Boyce-Thompson Southwestern Arboretum in Superior, Arizona. Upcoming events include: the Native Southwestern Corn Cookery Workshop in Tucson; talks to the Yuma chapter of the Arizona Native Plant Society; the Tucson Garden Club; Ocotillo Garden Club; Rolling Hills Garden Club; the USDA Water Conservation Laboratory and the Heard Museum in Phoenix; and with anthropological and agricultural groups in Mexicali, Baja California Norte, Mexico.

In terms of publicity and educational articles, we are grateful for the print space given to us by the Seed Saver's Exchange; Sunset; Sunflower; Organic Gardening; Native Self-Sufficiency; Agroecosistemas; and in the Tuscon Daily Star. Board President Gary Nabhan was elected to the National Bean Advisory Committee while giving a presentation at the Dry Bean Council meetings in Minnesota. To all our collaborators and friends who helped Native Seeds/SEARCH germinate in 1983, we wish you a Fertile and Productive New Year!

---Mahina Drees

Published quarterly by Native Seeds/SEARCH, 3950 West New York Drive, Tucson, Arizona 85745.

Historic Prescott Dry Farm Yields Suggest Future Opportunities

(A recent U.S. Congress OTA study challenged farmers in the arid West to make better use of rainfall and runoff, due to impending shortages of groundwater and river diversion irrigation water. Mexico's arid lands experts have also urged farmers to reconsider rainfed agriculture, which may have lower yields per unit area than irrigated crops, but a better ratio of energy and monetary returns to investments. Yet what can we expect from rainfed fields in the Greater Southwest? Barney Burns provides some thoughts on this in the first of several articles.)

Dry farming (or non-irrigated, rainfed agriculture) has been practiced in Arizona for centuries. Still, crop yield records for anywhere in the state are rare and difficult to locate. Recent issues of the annual Arizona Agricultural Statistics do not cover non-irrigated crop acreage or yields. Few farmers in Indian, Mexican-American or Mormon communities have kept accurate records over the years, or compared results, since they dry farm in widely separated localities.

Where can estimates of Arizona's dry farming potential be found? Perhaps the only published records are from a group of experimental dry farms established by the University of Arizona around 1910. Even these records are short and difficult to interpret. Because experimental conditions and varieties were changed from year to year, it is impossible to make precise correlations between these yields and local rainfall records. However, we can gain an idea of what levels of crop yields one might expect at a semi-arid site, and what variables are involved.

The Prescott Dry Farm records, maintained by the Arizona Agricultural Experiment Station between 1912 and 1927, offer the most detailed results. This 110 acre farm was located along Granite Creek 7.5 miles north of Prescott at an elevation of 4980 feet in an oak grassland. Research efforts concentrated on animal feeds from a variety of crops. Corn and dry bean crop yields were obtained between 1912 and 1918 and are the most valuable for this analysis.

Climatic conditions at the Prescott Dry Farm are of special interest since much of Arizona lies within mid-elevations of similar character. Table 1 compares the short records from the dry farm with longer records from the slightly higher town of Prescott. For 1913-1927, the farm averaged 14.72 inches of precipitation and 185 frost free days. The town received more rain than the farm did for these periods. But by using the longer period of records from the town to place the 1913-1927 period in perspective, we can see that the farm was maintained during a 15 year period of unusually wet winter/springs and summers.

More specifically, for the 1913-1918 period of corn and dry bean production, January-May values were above the long term seasonal average, but June-September values were well below the longer term seasonal average. This suggests that the 6 years of dry bean crops had sufficient moisture for good germination, but may have lacked sufficient soil moisture to insure optimum yields. Direct correlations are difficult, because factors such as rain intensity, duration, and periodicity, as well as crop spacing and soil quality varied between years.

Table 2 presents a summary of per acre corn yields. Southwestern Indian varieties yielded the most in 2 years, and 2 introduced but non-hybrid corns yielded the most in the other 2 years. Years of highest yields do not correlate with the wettest years, but some indication of consistent yielders can be gained.

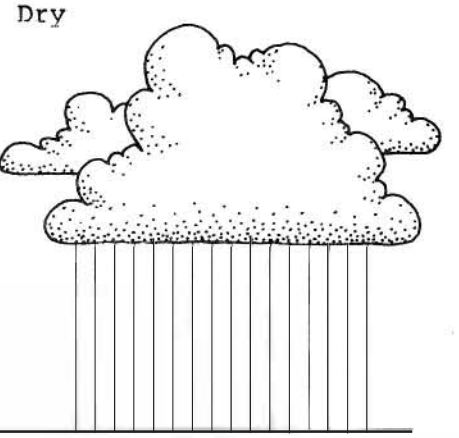
Table 3 presents data for beans, which indicate the highest yields were in a year (1915) of great winter/spring precipitation that also had the highest annual rainfall for the 1912-1918 period. Since the farm was unfenced, small mammals

(cont. on next page)

Table 1: Comparison of city of Prescott and Prescott Dry Farm seasonal and annual precipitation averages.

Interval	Jan.-May		June-Sept.		Annual	
	City	Farm	City	Farm	City	Farm
1913-1915	6.04	4.16	6.62	6.39	17.00	13.87
1913-1918	8.71	4.96	6.55	6.76	18.63	14.41
1913-1927	8.63	4.67	8.38	7.06	21.58	15.59
1877-1879	6.63	----	7.95	----	18.75	-----
1900-1979	6.97	----	8.38	----	20.22	-----

*ALL VALUES IN INCHES.



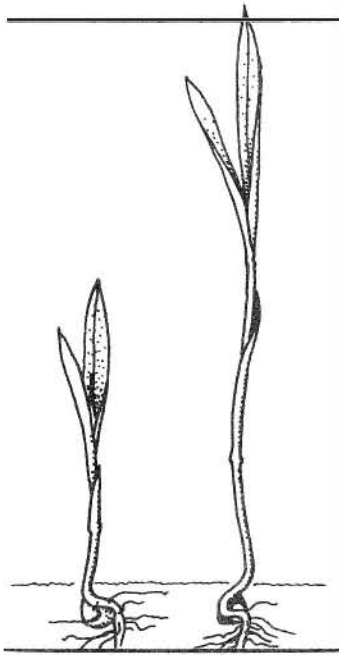


Table 2: Comparison of Arizona Indian and introduced corns.

Corn variety	Pounds per acre				
	1912	1913	1914	1915	Average
Arizona Indian corns					
Hopi Blue Flour	----	1600	444	792	945
Hopi Yellow Flint	----	208	732	1144	645
Hopi Yellow Flour	1124	736	470	784	778
Pima Yellow Flour	800	1084	845	996	931
Papago Sweet	1740	820	492	84	784
Mohave Yellow Flour	----	----	1240	----	1240
Introduced corns					
Hickory King	----	1452	----	696	1074
Reids Yellow Dent	1124	3920	883	1760	1947
Bloody Butcher	----	1882	656	860	1133

Table 3: Comparison of Arizona Indian and introduced dry bean crop yields, in pounds per acre.

Bean variety	1912	1913	1914	1915	1916	1917	1918	12-15	12-18
Arizona Indian beans									
Tepary	237	#	368	720	#	306	229	331	266
Hopi Yellow	----	----	400	424	----	----	----	412	----
Hopi White	----	----	120	336	----	----	----	228	----
Hopi Lima	----	----	240	---	----	----	310	240	275
Other beans									
Lady Washington	275	184	490	744	0	258	100	423	293
Colorado Pinto	----	184	174	812	75	226	193	390	277
Mexican Pink	105	200	120	40	----	----	----	116	----
Burpee's Stringless	----	4	64	---	----	----	----	34	----
Bates	742	486	282	776	0	229	184	571	386

Destroyed by rabbits. In 1917 and 1918, all varieties except Bates had serious problems with small mammals, fungus or root rot.

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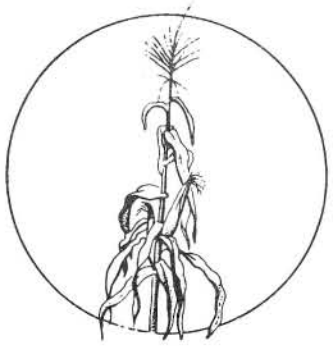
were pests that reduced production, particularly of teparies in certain years. Native Arizona varieties were not superior in overall yield, but may have been in other ways, e.g., protein content and nitrogen fixation, as recent studies have demonstrated these attributes. Nevertheless, Arizona Indian dry bean crop yields at Prescott averaged between 228 and 412 lb./acre for various periods.

Similar results have been obtained on a larger scale in southwestern Colorado since 1920. That region, with 2 local selections of pintos, has produced annual dry farming yield averages ranging from 149 to 744 lb.s/acre. A 396 lb. bean harvest is the average for a 35 year period in Colorado's five southwesternmost counties.

Although dry farmed bean yields fluctuate widely from year to year, Colorado rainfed pinto growers are known to bring in much more revenue with an occasional bumper crop than can irrigated growers. They can underprice irrigated growers because they use at least a fourth less energy in tillage, pest and weed control and water provision. The Prescott Dry Farm records should probably be viewed as minimal values that can be increased through better site selection and application of modern knowledge and appropriate technology. As early Prescott researchers noted, the supplementation of crops with floodwaters or runoff from adjacent slopes or arroyos could result in substantial yield improvements. Intercropping and additional selection or adaptation of native beans and corn to better fit a particular area's soils and climate might also help farmers make rainfed agriculture more viable for the Greater Southwest.

---Barney T. Burns



Saving Seeds and Breeds of AmerIndian Heritage

Prehistorically, North American farmers had numerous varieties of at least 18 plant species, but no domesticated animals other than turkeys and dogs. In early historic times, they accepted and selected certain Old World introductions, such as melons, criollo cattle, mustangs, and sheep; these have evolved over 3 centuries into unique forms. What is left of this heritage? Not enough. Because these historic genetic resources continue to be lost, a number of organizations in addition to Native Seeds/SEARCH are now working at the grassroots level to help people find them, maintain them, and better utilize such resources. We urge you to join in this effort:

ANIMALS

American Minor Breeds Conservancy
Box 225, Hardwick MASS. 01037
($10/member; $15/libraries)

American Indian Horse Registry
Rt. 3, Box 64, Lockhart TX. 78644
($10/dues-subscription)

Navajo Sheep Project
Multihorned Sheep Breeder's Newsletter
1607 232nd Ave. NE, Redmond WA. 98052

PLANTS

Seed Savers Exchange
Rt. 2, Box 11, Princeton MO. 64673
($10 subscription)

North American Fruit Explorers
10 SO. Madison St., Hinsdale IL. 60521
($5 membership)

GENERAL/NATIVE AMERICAN RESOURCES

Native Self-Sufficiency
Tribal Sovereignty Program
P.O. Box 10 Forestville CA 95346
($6/individual; $15/organization)

Book Review

WATER RELATED TECHNOLOGIES for Sustainable Agriculture in U.S. Arid/Semiarid Lands

Prepared for the U.S. Conress by the Office of Technology Assessment. Report Number OTA-F-212, October 1983. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. 412 pages.

This summary of technical reports on Western water supply problems and potential "technological fixes" is well-integrated, readable and provocative. It covers both hi-tech proposals such as cloud-seeding, dams, and large-scale desalinization, as well as more modest options such as the better use of native crops and storm runoff. Worth several readings, with a critical, ethical eye!

----Gary Nabhan

Native Blue Corn Cookery Know-How

Planting native crops in our gardens to reap their harvests is the first step in bringing into our lives the genetic diversity which once thrived in the Greater Southwest. The second step is eating foods made from the plants which were so carefully planted and tended. This may sound simple until one comes face to face with a homegrown ear of blue corn. Do you eat it or just look at it? By the time its kernels are deep blue, they are too tough to be eaten fresh like corn on the cob.

Most Hopi and Pueblo blue corns are flour corns, though a few flints remain. Both are eaten by grinding the dried kernels into a meal or a finer flour, depending upon the food to be prepared. Hopi women often grind it so fine that they can rub it on their faces like powder, but commercially-sold meal is often quite coarse. If your skills with a mano on a metate are a little rusty, and you can't afford an electric grinding mill, such coarsely-ground meal can still serve in many corn recipes, or you can use a hand-cranked grinder to make it finer. Ground corn should then be baked in a pan at 350 degrees F. for about twenty minutes, cooled and then reground. As Hopi friends remind us, blue corn foods taste better and look bluer if finely sifted ashes from juniper, saltbush or bean vines are added. Dr. Harriet Kuhnlein has documented that ash supplements the calcium and iron content of corn foods.

Here are two easy recipes for utilizing blue cornmeal:

BLUE CORN TORTILLA-CREPES

1 cup roasted blue cornmeal
1 egg
3/4 cup milk
1/8 teaspoon salt
1/2 teaspoon ash
or 1/4 teaspoon baking soda
corn oil or sunflower oil

1. Combine cornmeal, egg, milk. salt and ash in a blender or food processor, mixing well. Let stand, covered, for about an hour. 2. Place a crepe pan over moderate heat for 1 minute; brush lightly with oil. Stir batter, then pour a scant 3 tablespoons into the pan. Quickly tilt the pan to coat it evenly, thinning the batter. (If it does not flow evenly, add a tiny bit of milk to the batter for the next crepe.) 3. Cook the crepe until the top side is slightly dry and the underside is golden brown. Flip it, and keep in pan 15 seconds more. Place each finished crepe on a sheet of wax paper, add another sheet, and stack another crepe. Use for enchiladas or other Southwestern Indian/Mexican dishes. (Adapted from Elizabeth Schneider, Food and Wine)

BLUE CORN BREAD

2 cups blue corn meal
2 cups unbleached wheat flour
1/2 cup unrefined sugar (or honey)
8 teaspoons baking powder
1 teaspoon salt or ash
2 eggs
2 cups of milk
1/2 cup sunflower oil

1. Combine cornmeal, flour, sugar, baking powder and salt or ash. 2. Blend eggs, milk and oil to add to dry ingredients. Stir into them, just enough to blend. 3. Bake in greased flat cakepan 12 X 9 X 2 for 25 minutes at 400 degrees. (From Mary Erickson)

---Karen Reichhardt

Seedkeepers in their Own Right

BINATIONAL TEAM WORKS
TO SAVE SALTGRASS GENES

In the 1880s, when ethnobotanist Edward Palmer visited the Cocopa Indians of the lower Colorado River, he viewed 40,000-50,000 acres of saltgrass that provided the major spring food of the these delta dwellers. In addition to the widespread Distichlis spicata, another saltgrass was observed by Palmer that had unique characteristics, including large grains. This Colorado River "wild rice" became named Distichlis palmeri. As anthropologist William Kelly later wrote, "the importance of (trigo gentil) to the Cocopa cannot be overemphasized. The grain makes a good food and it was much enjoyed, but more important, it was the first sizeable wild food crop...and was obtainable in sufficient quantities to help tide the families over the most critical food period of the year."

But within the next half century, the Colorado was dammed, diverted, and degraded. By the time new crop advocates such as Richard Felger realized the significance of this Distichlis palmeri in the late 1970s, no one had collected the species for decades. It was conceded that its habitat was diminished by the dams and introduced salt cedar on the once-diverse delta, and that this special native food was probably extinct.

Then Dr. Nick Yensen, an ecologist of saline environments, and his wife, Susana Bojorquez de Yensen, a Sonoran nutrition scientist, became interested in this plant. Nick had helped evaluate nearly a thousand kinds of salt-tolerant plants for their agronomic potential, realizing that already, a third of the world's irrigated lands suffer from salinity problems. His coworkers had dismissed saltgrasses after three years of preliminary work, assuming that they would be difficult to seed. Yet Nick guessed that if they could be directly seeded into saltwater, they would do much better than they had. His hunch bore fruit, for Susana and Nick have now successfully established field plots of certain saltgrass selections near the Gila and Colorado

photo by Charles Williams

Rivers. They reach their optimal production in alluvium periodically inundated by 35-40 ppt salinity.

After chemical and ecological work on saltgrasses in general, Susana and Nick began to explore the delta to see if any of the large-seeded Distichlis palmeri that Palmer had described remained. With the aid of a Tinker Foundation grant to Susana, they were able to fly and boat the channels of the Colorado until they finally rediscovered remnant "fields" of Distichlis palmeri!

Having relocated, conserved and increased the seed of this thought-to-be "extinct" wild grain, Susana initiated nutritional studies of it. Trigo gentil is about 8% protein, high in carbohydrates and fiber, and low in salt and gluten. Sweet tasting, and of good consistency for making tortillas, breads, atole and biscuits, it may be a good substitute for wheat for people allergic to gluten.

Nick and Susana will continue basic research on this plant for several years, evaluating its potential for under-developed countries. They envision a coastal laboratory with saline field plots where yields of trigo gentil can be measured. For more on their plans, write Yensens, 727 No 9th Ave, Tucson, 85745.

---Gary Nabhan

Publications Reviewed

NEW MEXICO'S AGRICULTURAL HISTORY

Various authors; edited by J.R. Rosenfelt. El Palacio, Volume 89, Number 1, 1983. Published by the Museum of New Mexico, P.O. Box 2087, Santa Fe, N.M. 87503. $3.00 per copy; $12 per year.

Five of the six articles in the Spring 1983 El Palacio discuss the agricultural history of "The Land of Enchantment." Each of the five short articles is conceived with a special topic, but when taken together, they provide a fascinating overview of New Mexico's agriculture over the centuries. Vorsila Bohrer's 2 page "teaser" reviews the pre-agricultural food conditions in New Mexico prior to the introduction of corn, beans and squash around the time of Christ, (briefly noting a record of grain amaranth from this period as well). Gail T. Tierney presents a chronicle of the domestication of this famous food triad, as that process came to affect New Mexico. Marc Simmons' brief, but excellent, piece summarizes the variety of factors that influenced the state's colonial agriculture between A.D. 1600 and 1846. Robert Frazer recounts the influence of the U.S. military on farming between 1846 and 1861. Finally, the nine photos selected by Richard Rudasill eloquently portray aspects of New Mexico's "traditional" agriculture as practiced during the last century.

This special issue of El Palacio is particularly valuable to students of New Mexico and of arid lands agriculture. We believe that three dollars invested in this issue will enable our readers to reap a harvest of interesting facts and valuable ideas.

---Barney T. Burns

AGROECOSISTEMAS-Boletin informativo

Edited by Ing. Efraim Hernandez X.. Available from Rama Botanica, Colegio de Postgraduados, Chapingo, Mexico. 4-6 times a year. (Free, but a donation towards international postage would probably be appreciated.

For over a quarter century, Efraim Hernandez X., known as "Xolo" to his friends, has been one of the foremost ethnobotanists and germplasm collectors in the Western Hemisphere. His newsletter, in Spanish, but including abstracts and translations of work done in several languages, covers genetic diversity issues, new crops studies and analyses of the diverse agricultural systems developed by indigenous cultures around the world. It constantly reminds us that the genetic diversity of crops has evolved largely in small scale, multicropped fields that have been managed over millenia by native farmers with a remarkably rich folk science to guide them. Viva Xolo!

---- Gary Nabhan

YES! I'd like to help in the conservation of native crops and their wild relatives in the American Southwest. Enclosed is a contribution to Native Seeds/SEARCH for: (check off)

ASSOCIATE MEMBERSHIP (1 YR., $10.00)
(Includes newsletters, and 10% discount on seed purchases, workshops & publications)

LIFETIME ASSOCIATE MEMBERSHIP ($100.00)
(All of the above for every year...)

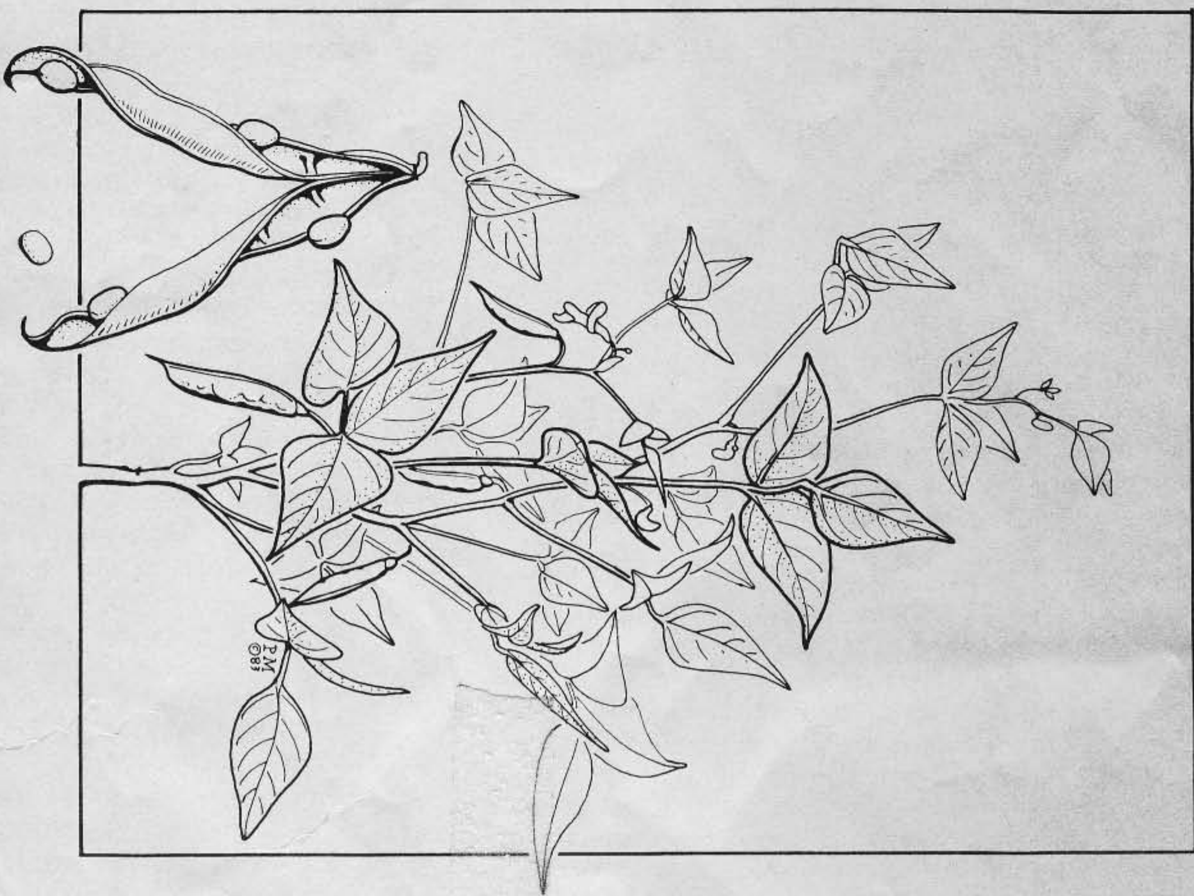
LISTING OF SEEDS AVAILABLE ($1.00)
(Garden packets of over 50 varieties of native plants, $1.00/packet)

SPECIAL CONTRIBUTIONS TOWARD RESEARCH AND CONSERVATION PROJECTS (Your choice)
-Native seed collection/conservation:
-Virus-free tepary grow-out:
-Conservation of wild chile stands:
-Nutritional analysis of native foods:

TOTAL ENCLOSED:_____

YOUR
NAME:_____
ADDRESS:_____
TOWN & ZIP:_____

Send to: Native Seeds/SEARCH
3950 W. New York Drive
Tucson Arizona 85745



DOMESTICATED TEPARY BEANS
(_Phaseolus acutifolius_)
DRAWING BY PAUL MIROCHA

Native Seeds •SEARCH
3950 West New York Drive
Tucson, Arizona 85745