No. 5, 1984 Spring Equinox

the Seedhead News

Board of Advisors To NS/S Initiated

Native Seeds/SEARCH has initiated a Board of Advisors of individuals with unique experiences in the areas of desert plant ecology and utilization; native foods; Indian nutrition; seeds, water and land conservation. These advisors will guide us, providing technical information, contacts and insights as our various projects proceed. We are proud to announce the involvement of the following people:

Martha "Muffin" and Tony Burgess. ---Muffin is Special Events Coordinator at the Arizona-Sonora Desert Museum, and among the most creative teachers of desert natural history and ethnobotany in the Southwest. Tony, a Research Assistant with the USGS, and ecology graduate student at the University of Arizona, is well-known for his field botany in the Sonoran and Chihuahuan deserts, and his agave studies.

Dr. Vorsila Bohrer. ---An archaeobotanist at Eastern New Mexico University, Dr. Bohrer has made intensive studies of plant uses of the Hohokam, Anasazi and Zuni Indians. She has also documented several food plants that have become locally extinct in the Southwest since prehistoric times, including a native barley.

Dr. Robert Bye and Sra. Edelmira Linares. ---Dr. Bye is affiliated with both the University of Colorado and UNAM in Mexico. A graduate of Harvard, he is an expert on Tarahumara ethnoecology, and plant evolution in cultivated environments. Edelmira has directed educational activities of UNAM's Botanical Gardens in Mexico, and is now studying medicinal plants in Colorado. Together, they are continuing studies of native plants in the Mexican marketplace.

Dr. Richard Felger. ---Affiliated with both the University of Arizona Office of Arid Lands Studies and the Institute of Ecology in Mexico, Dr. Felger is working on a global survey of edible plants. He and Becky Moser have a book on Seri Indian subsistence forthcoming from University of Arizona Press. Dr. Felger continues work on new desert crops as well.

Dr. Howard Scott Gentry. ---Research Director at the Desert Botanical Gardens, Dr. Gentry was a plant explorer for the USDA for 20 years, and remains active on the economic botany of new crops. He is the world expert on agaves, a jojoba pioneer, and ethnographer of the Warihio Indians.

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Dr Harriet Kuhnlein. ---Associate professor at the University of British Columbia, Dr. Kuhnlein is an ethnonutritionist who has worked on traditional foods, diet patterns and nutritional status of native people in North America, including the Hopi.

Michael Mc Nulty and Linda Lewis. ---Mike has been a innovator in water management and conservation policy as Director of the Tucson Active Management Area (TAMA) for Arizona's Dept. of Water Resources. He is a lawyer and former legislative aid to Congressman Mo Udall. Linda has formerly worked with the Sierra Club and TAMA on various conservation activities, and is on the field staff of Congressman Jim McNulty, where she is currently active in resource conservation and border issues. Both are native plant home landscaping enthusiasts.

Dr. Eric Roos. ---Dr. Roos is an expert on the maintenance of genetic variability, genetic shifts occurring in populations of stored seeds, and the applications of electrophoresis to germ plasm research. He is active in the American Society of Horticultural Science, and Anerican Society of Agronomy, with numerous technical publications to his credit.

Dr. Noel Vietmeyer.---As Staff Study Director for the Board on Science and Technology for International Development, of the National Academy of Sciences, Dr. Vietmeyer has played a key role in drawing to public attention a number of underexploited plant and animal resources that could help augment food production in marginal lands. A native of New Zealand and a biochemist by training, Noel has a talent for writing articles which capture the human and ecological drama associated with some of these unsung resources. His articles have appeared in National Geographic, Smithsonian, Horticulture, Quest and in many scholarly publications.

Kent Whealy. ---Kent is the founder and president of the Seed Saver's Exchange, the largest laymen network in the world concerned with preserving heirloom vegetable varieties. Kent and his wife Diane have helped this network reach into the gardens and hearts of people not usually touched by something as "esoteric" as genetic resource conservation. With his training as a journalist, and experience in rural living, Kent has found sympathetic readers around the world who are willing to help this grassroots movement. His family now lives near Decorah Iowa where Kent is completing a vegetable varieties inventory of North American seed outlets.

Anita Alvarez de Williams. ---Anita is one of the most active students of culture history and ethnobotany in Baja California, and has written several outstanding works on the Cocopah Indians, including a chapter in the Smithsonian's Handbook of North American Indians. An artist, photographer, and translator, she has been promoting teparies and other desert crops as a consultant for Industrias Agricolas in her hometown of Mexicali, B.C.N., Mexico.

Sonoran Panicgrass: Does It Merit U.S. Endangered Species Status?

(In the latest issue of Economic Botany, seed searcher Gary Nabhan and geneticist J.M.J. de Wet discuss a native crop and weed complex of agriculture indigenous to the Sonoran Desert. Their technical article brings up the possibility that both wild and domesticated Panicum sonorum, millet- like grains used for centuries in this region, may be endangered. They have not been collected north of the Mexican border for decades, but it is still not clear if they are truly extinct in the U.S. The following article poses the question, "Do species more associated with agriculture than with natural habitats qualify for protection under the Endangered Species Act of 1973?" For further information on the history of these plants, see "Panicum sonorum in Sonoran Desert Agriculture," Economic Botany 38(1): 65-82, 1984.)

Drawing by Nancy Evans Weaver

In our recent article on Sonoran panicgrass, Dr. de Wet and I provide evidence that two races of this species were found in Arizona prehistorically, one of which may be among the 4-6 native plants to be domesticated north of MesoAmerican civilizations. On the lower Colorado River, and in eastern Sonora, several tribes once harvested these nutritious grains containing as much as 12.8% protein, ground them, and used them for tortillas, tamales, atole and pinole.

Today, these grains may now be grown only in a few Warihio Indian villages on the Sonora-Chihuahua border. Worried that the domesticated seedstock may have been near extinction when he lived in the sierras the 1930s, Dr. H.S. Gentry encouraged us to explore for it in the headwaters of the Rio Mayo. In 1978, seed searcher Barney Burns led Tom Sheridan and I on an arduous mule trip into the barrancas where Gentry had last seen this crop under cultivation, and we obtained some surplus seed from Warihio farmers. Rafael Aguirre, Eric Powell and Edmond Faubert have also helped us collect remaining germplasm of this crop, for increase. Sadly, when we have returned this grain to other Indians whose ancestors once grew it, they regret that native agriculture has been so long disrupted that no local seedstocks remain. The drastic environmental changes that have occurred with the damming of the Colorado River have destroyed habitat for both the wild and domesticated races of Sonoran panicgrass, neither of which has been collected north of Mexico since 1940.

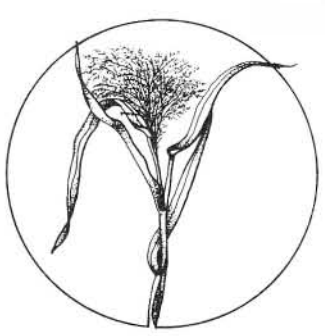
Ironically, we have never seen Sonoran panicgrass listed on an official state or federal list of rare, threatened or endangered plants! Has this inconspicuous-looking grass species been ignored because conservationists are so preoccupied with cacti and succulents threatened due to their ornamental value? Or does the association of Sonoran panicgrass with native agriculture make botanists feel that its former presence in the U.S. was somehow "artificial"? It is tragic that in these days of convoluted arguments for conserving all wild species due to their presumed "hidden" economic potential, we have failed to protect a species that was clearly a major food resource of prehistoric and historic Americans.

However, at least two complications may diminish the chances that these food plants will receive official consideration and protection. First, Hoover Dam and other environmental changes such as tamarisk invasion may have caused the extinction of Sonoran panicgrass in the U.S. by 1940. Is it too late for consideration? I believe not. Nick and Susanna Yensens' recent luck in finding supposedly extinct Palmer's saltgrass on the Colorado River Delta suggests the possibility that remnant panicgrass stands may still exist in relatively inaccessible areas (see the previous issue of The Seedhead News).

Second, taxonomist Alan Beetle, while preparing a multivolume work on the grasses of Mexico, has come to the conclusion that weedy Sonoran panicgrass is but a variety of a more widespread species, and should be subsumed under the name, Panicum hirticaule var. miliaceum. Beetle's brief 1981 article in Phytologia ignores the fact that both the wild and domesticated races are genetically more robust than, and distinctive from, any well-watered and fertilized P. hirticaule. Further, he ignores long-standing evidence of the domesticated race, falsely assuming that there is only a widespread weed, occasionally cultivated among corn plantings. Yet even if Sonoran panicgrass is relegated to varietal status, it could still be a candidate for endangered species protection.

Over the next two months, we will be writing up forms for the U.S. Fish and Wildlife Service to begin formal consideration of Sonoran panicgrass as a candidate for new exploration and (if rediscovered in the U.S.) protection. We will need letters of support to encourage this effort, so write us if you are willing to help.

---Gary Nabhan



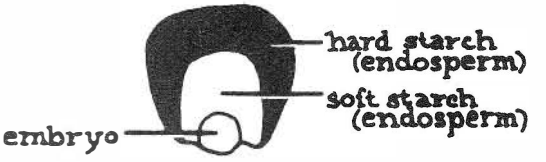
Seedkeepers in their Own Right

(Charlie Miksicek is an ethnobotanist and University of Arizona PhD. candidate who has published on corn history in journals ranging from Nature to The Kiva. He grows a backyard full of corn and teosinte varieties each summer, many of which he crosses and harvests for later study. His study of corn history has taken him from the Hopi and Zuni Pueblos, to the Andes and swamps of Belize, to the prehistoric Hohokam terraces on Tumamoc Hill overlooking Tucson. The following article is a summary of Charlie's fine talk presented to a Native Seed/Search maize workshop held at Tucson Botanical Gardens in January, 1984.)

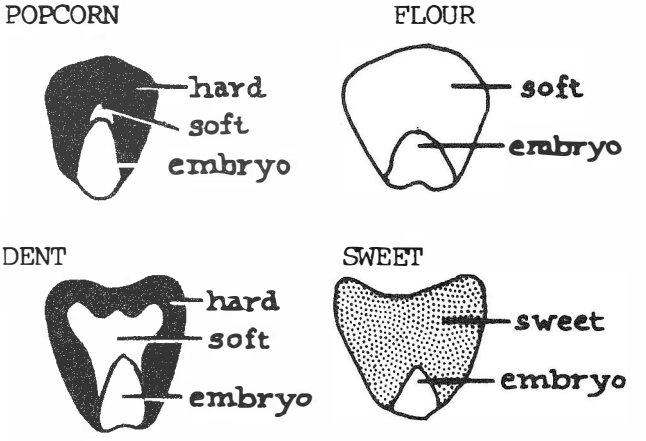
Maize is an intriguing anomaly in the grass family. It has been classified into over 400 races or groups with similar genetic traits. The most familiar corn type to North Americans is the yellow field corn known as Iowa Cornbelt Dent. Yet it is only one small part of corn history, which can be traced back at least as far as the earliest archaelogical remains of cultivated maize, 7000 years old, from caves in the Valley of Tehuacan, Mexico. Charlie has attempted to reconstruct this early corn type by crossing a primitive flinty popcorn known as chapalote---still grown in southern Sonora--- with annual teosinte, its closest wild relative.

Charlie acknowledged that the origins of corn have been the subject of heated debate. He reviewed three theories that have been postulated to explain the aberrant nature of this domesticated grain. One theory, in vogue for decades, assumed corn to be a cross between a wild Tripsacum grass, and a now extinct wild corn. Another theory has argued that corn gradually evolved directly from teosintes under human selection similar to that exerted on other cereals. The seedhead of teosintes looks quite different from that of corn--- it consists of a row of small kernels "strung" on a tiny strand of rachis that breaks apart when dried. Certain morphological traits of teosinte have suggested to botanist Hugh Iltis a third theory, which postulates that teosinte was rapidly, radically altered at one point in history. Called the Catastropic Sexual Transmutation Theory, it is based on the idea that the tassle of teosinte was converted into the ear of corn, as the male flower part was transmuted into a female flower. Though relatively complicated, this theory resolves certain "mysteries" of corn evolution which other theories fail to do.

Charlie then reviewed with us the Anglo-American system of corn classification based on kernel characteristics, in particular, endosperm texture and shape. First, he cross-sectioned a flint corn kernel, and identified its morphological components:



Then, he had us cross-section kernels of various types of corn so that we could see differences between them:



Charlie showed how these various endosperm characteristics affect the foods for which each type is suitable, and control the relative ease of grinding each too.

As a final note, Charlie reminded us that the American public uses only a small portion of the available genetic diversity in maize. While 'new' varieties are released every year or so, most of these are minor modifications of a narrow genetic base. To help us acquaint ourselves with the diversity of maize varieties suited to the Southwest, Charlie helped us put together an annotated bibliography on Southwestern corn history, cookery, nutrition and classification, available for $1.00 by mail from NS/S.

Book Reviews

FADING FEAST: A COMPENDIUM OF DISAPPEARING AMERICAN REGIONAL FOODS

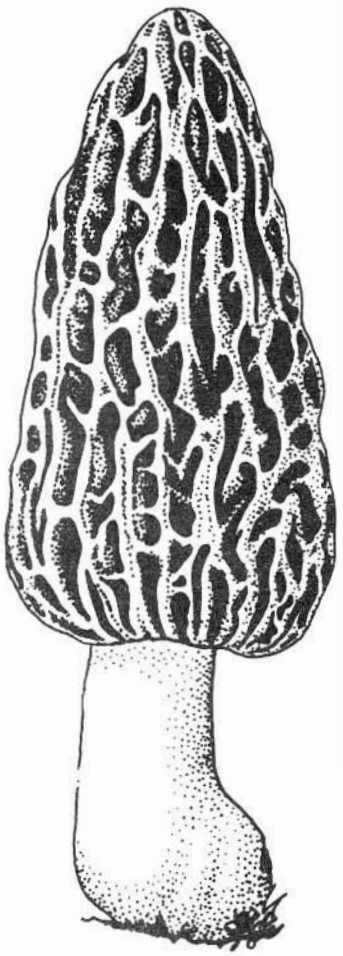
by Raymond Sokolov. 1983. Paperback edition published by E.P. Dutton, Inc., 2 Park Ave., New York, N.Y., 10016. 276 p. $6.95.

When it comes to feeding our stomachs, we Americans are becoming a people of no surprises. We are comforted by knowing that we can travel to any American boulevard and find franchises, fast food restaurants and supermarkets, all with convenience foods to which we have grown accustomed. To find savory regional dishes, Sokolov had to travel far from the main highways, to towns and counties of rural America. There, authentic regional recipes endure. Earlier, when people were more isolated and agricultural, they depended upon local resources: wild edible plants, heirloom vegetables and fruits, or game and fish.

In this book, we learn how the Key Lime was once grown commercially in the Florida Keys, but persists only in a few groves there. It has been replaced by the Tahitian Lime from California, which is less of a business risk because it is less perishable, but it is also much less pungent in flavor. Infrequent, but not quite as rare, are morel mushrooms, which are still collected in abundance on a few Michigan farms, and wild rice, gathered by native Americans in the wetlands of Minnesota. A native Texas wild rice, Zizania texana, is truly endangered. Other foods, such as Colorado lamb, Smithfield ham and La Jolla abalone, are local delicacies of which even local residents may be unaware.

Of special interest to seed searchers is the chapter on Hopi blue corn. Sokolov, who is the foods columnist in Natural History magazine, has done a fair amount of background research on each of the 24 items featured in chapters of this book, and includes many recipes. For those who have not yet conceptually grasped the biological diversity which regional cuisines once drew upon, let their taste buds teach them this lesson!

---Karen Reichhardt



Drawing by Kay Mirocha

Morchella conica (Morel)

DIVERSITY: A News Journal for the Plant Genetic Resources Community

by the Laboratory for Information Science in Agriculture, Colorado State University, 320 Aylesworth, Fort Collins, CO. 80523. Quarterly, $35 a year.

In its third year, DIVERSITY is the best way to keep in touch with USDA involvement in plant germplasm resource conservation and utilization. It highlights recent fruit, nut, vegetable and grain exploration trips, announces upcoming meetings and research proposal deadlines, and analyzes national or international studies which suggest new directions in genetic resource management, germplasm maintenance or plant protection. Its viewpoints column offers insight into controversial issues upon which everyone in the USDA may not be in full agreement. May DIVERSITY continue to evolve & inform!

GENES FROM THE WILD: USING WILD GENETIC RESOURCES FOR FOOD AND RAW MATERIALS

by Robert and Christine Prescott-Allen. 1983. Published by the International Institute for Environment and Development, London. Available from Earthscan Books, 1319 F. St. NW, Washington, D.C. 20004. 101 p. $5.50 plus handling.

This is the most technically accurate and insightful book yet to come out for laymen interested in genetic resources. It clearly documents which genes originally found in wild species have been utilized to improve or sustain major food, forage and industrial crops. It then discusses the threats to wild relatives of crops, where they are located geopolitically, and who benefits from them. Controversial issues are reviewed in a balanced manner, without any shrillness. The Prescott-Allens urge coordination of ex situ conservation in seed banks and botanical gardens with in situ conservation via preservation of natural and traditionally managed habitats. This book should be read by anyone coming from an agricultural background who is willing to consider what "nature conservation" concerns offer to the future of global food production.

---Gary Nabhan

AGROECOLOGY---The Scientific Basis of Alternative Agriculture

Written and distributed by Miguel Altieri. 1050 San Pablo Ave., Albany, CA 94706. $11.00 (including mailing); make checks payable to Agroecology.

Dr. Altieri, a South American now working for the Division of Biological Control at the University of California at Berkeley, has written a book that analyzes the ecological benefits of practices derived from indigenous agriculture around the world. For almost a decade, he has been publishing technical articles on the beneficial use of weeds, cover crops and intercropping in the control of pests and diseases. With this book, he has synthesized much of his own primary research and that of others to outline the principles of ecological management of vegetable, grain and tree crops, with their associated weeds, insects and soil microbes. In it, the wisdom accumulated by farmers over centuries is not discarded, but built upon. This is a critically important book, and one which we will say more on later.

VOLUNTEERS

We wish to thank Jodi Shramm, Charlie Miksicek, Alison Galloway, Esther Moore, Laura Rose, Bettina Martin, John Andrews, Cindy Baker, Helga Teiwes and Kay Mirocha for helping us with various tasks lately.

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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:_____

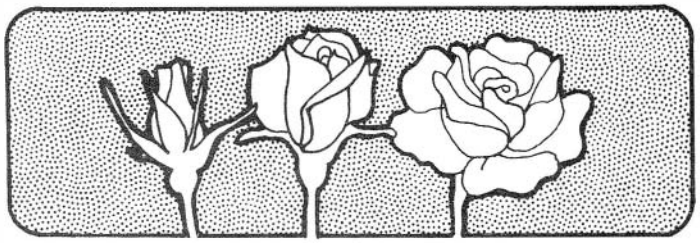
YOUR
NAME:_____
ADDRESS:_____
TOWN & ZIP:_____

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

Native Food Nutrition Update

Miss Radziah Ariffin, a food scientist from Malaysia, has begun work analyzing a number of desert plant products utilized as food by the Pima, Papago and neighboring tribes. Miss Ariffin and her University of Arizona master's degree committee have agreed to collaborate with Native Seeds/SEARCH on this project, with our organization providing 100 gram samples of various foods for analysis. Collection, cleaning, transport and documentation of these food samples are being underwritten by members' contributions to NS/S. Among the cultivated plants already being analyzed are 60 day flour corn, reventador popcorn, striped cushaw squash fruit and seeds, and Papago varieties of peas and black-eyed peas.

We are grateful for the interest of Diane Enos and Deanna Francis of the Salt River Reservation, who will be helping us obtain additional Pima foods for study. We are also cataloguing previously evaluated wild and cultivated plants of the U.S./Mexico borderlands, to help identify gaps in our knowledge of native food composition. Thanks to Bettina Martin for helping us with this task. Stay tuned for further developments.



New Sprout Arrives

Laura Rose Nabhan was born to Seed Searchers Karen Reichhardt and Gary Nabhan on February 27, 1984 at 8:40 a.m. Named for Laura Kermen who blessed us with her San Juan's Day Open House speech, little Laura is doing fine, thanks to the constant attention given to her by brother Dusty, age 2. (If you are wondering why correspondence with Gary or Karen has been slow lately, now you know! The desert smells like diapers again!)

Native Seeds • SEARCH
3950 West New York Drive
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