A PLACE AT MOTHER EARTH'S TABLE VOL. II

EDIBLE WILD PLANTS OF THE RIO GRANDE REGION

LISA W. HUCKELL
MAXWELL MUSEUM OF ANTHROPOLOGY
UNIVERSITY OF NEW MEXICO

1. Northern Paiute women and children processing piñon. Photograph courtesy of Nevada Historical Society

ACKNOWLEDGEMENTS

Many people contributed to the success of the Maxwell Museum's Food & Life series of which this publication is just one part. I would like to thank the following people and organizations for their assistance and generosity:

Sponsors of the event who generously provided financial support or products for sampling: The Robert Wood Johnson Foundation Center for Health Policy at the University of New Mexico, UNM Division of Student Affairs, Ortiz Center for Intercultural Studies, Maxwell Museum Association, A & J's Family Farms LLC, La Montanita Coop, Madhava Agave Nectar, and Omega 3 Chia.

Contributing Institutions: Autry National Center of the American West, Bancroft Library at the University of California Berkeley, Maxwell Museum of Anthropology, Native Seeds/SEARCH, Nevada Historical Society, University of Chicago Archives, University of Nevada -Reno, United States Department of Agriculture Plants Database and the many contributors to the database, and Yosemite National Park Archives.

Individuals and companies who contributed photographs or gave permission for images to be used: Arizona State Museum, Dr. Ruth Greenhouse, Omega 3 Chia, Quinoa Corp.

Maxwell Museum staff including Mary Beth Hermans, Emma Difani and Catherine Baudoin, and volunteers who gave their time at the lectures and tasting event, thank you so much for making it such a success. We couldn't have done it without you!

WELCOME

Welcome to the second presentation in our series "A Place At Mother Earth's Table". We will be looking at 20 plants this time, and this booklet is designed to help you on your journey of discovery. We have made changes in the plants we will present in this program, deleting some, adding others, and repeating the popular ones. We have maintained the format used in the previous booklet for the 6 new plants which includes a description, ethnobotanical or historic and modern plant use summary, the kinds of archaeobotanical evidence that are found that tell us about past plant uses, and a summary of available nutrition information. Repeated plants will have an abbreviated treatment focused on uses and nutritional attributes with new photos where possible so that redundancy is minimized.

INTRODUCTION

It's a startling figure. Most of the world's people now receive the bulk of their calories and protein from just 20 plant species that includes a handful of grains, root crops, legumes, and a few others. Trying to feed escalating global demands for food with such a small larder places us in a precarious position, jeopardizing our future through excessive dependence and use of genetically uniform monocultures and placing us at risk for catastrophic loss from unknown pathogens and predators. We have a vivid reminder of what can happen in the tragic cautionary tale of the Irish potato famine. Alarms have been sounded that we need to diversify our food supply.

This applies at a more local level as well, where we accept limitations on our diet breadth because of convenience, lack of time, seductive marketing, and stressful urban lifestyles, all of which condition us to see food as coming in packaged units that reveal little about what is in it and where it came from. In an increasingly complicated and technological world, we have become distanced from our roots as gatherers and growers of food as we have traded production for consumption. Few family farms survive today in a nation that prides itself on its agrarian heritage. We still defer to a distant past when our kids get a 3 month summer vacation that was originally designed to free them from school to work on the farm.

Growing dissatisfaction with the status quo, the unprecedented corporate influence on our food supply, our growing public health concerns about obesity in adults and children, and skyrocketing rates of diabetes have encouraged us to search for better food alternatives and healthier diets. Concepts like sustainability, permaculture, the slow food movement, being a locavore, farmers' markets, small space gardening, and more have acted to heighten our awareness of the importance of good fresh food and how to get it. One way is to look back at the wild plants used in the past that provided sustenance, flavor and variety to people who made their living from the land. Some of these plants have transitioned from food to weed status simply because they are no longer welcomed in fields by agribusiness. But continuing research into the nutritional profiles of these plants reveals the folly of ignoring, or worse, destroying these foods.

Nutrition Considerations

As we know, various foods provide different quantities of the protein, carbohydrates and fats that human bodies need to grow and to maintain health. While we have access to many choices in well-stocked markets, traditional societies relying primarily on plant foods and game had to consume foods that provided these critical elements. An especially important concern is the need to obtain 8 essential amino acids that cannot be synthesized by the body and must be obtained from food. Animal products have them all, but staple grain crops do not, requiring a complementary food to be eaten to create a complete protein. Here in the Southwest, the staple crop maize lacks lysine and tryptophan, which can be obtained from amaranths and chenopods like quinoa.

Vitamins and minerals are also important elements of nutrition and are supplied by wild plants. As an example, calcium is found in cholla buds, chia seeds, agave, ricegrass and chimajá, sometimes in quantities that exceed the glass of milk gold standard; all are important sources for people who don't drink milk after weaning. Many of our local wild plant foods offer this kind of benefit.

New knowledge about phytochemicals, Omega-3 fatty acids, free radicals and antioxidants, and anti-inflammatory foods indicates that eating fruits, vegetables and good fats from seeds and nuts are excellent ways to expand our diets in positive directions. In particular, chia and purslane deserve our attention as superfoods that address these concerns.

An additional benefit is that many of these wild foods are low glycemic, acting to minimize the dangerous spike in blood sugar that occurs when excessive sugars and carbohydrates are consumed. The incorporation of traditional foods like prickly pear, mesquite, and chia into Native American diabetics' diets have helped to reduce the severity of symptoms. Wild grains like ricegrass and dropseed along with quinoa are gluten-free foods that can be eaten by the growing numbers of celiac disease sufferers who cannot tolerate wheat gluten.

This booklet will help you explore 20 plants with great nutritional attributes. In the process you will be able to expand your diet breadth and engage in more healthful eating. Diversifying the foods you eat will help ensure that you get the nutrients you need from the plants themselves rather than a pill.

A Note About Domestication

In the absence of sufficient quantities of some wild plants' edible parts, we are offering instead for the tasting part of the program domesticated forms of these genera. Sunflower, amaranths and chenopods are represented by modern commercially produced seeds. They are the products of a deliberate selection process by people to modify the plants to yield a desired product. Domestication usually occurs when food supplies need to be increased beyond what the vagaries of nature provide. Production can be intensified and controlled with a larger, more reliable harvest the reward. This began during what has been called the Neolithic Revolution some 10,000 years ago and led to the development of our major grain crops as people made the transition from hunting and gathering to agriculture-based economies.

2. Domesticated and wild sunflower seeds

3. Hopi dye sunflower

4. Grain amaranth large inflorescence

Domestication involves changing plant behavior, which often is reflected in physical changes of the plant. Included are the loss of dispersal mechanisms so that grains won't shatter but will stay in place for harvesting, the loss of dormancy so that the plants will germinate and mature at the same time to maximize the harvest, and choosing annuals over perennials to get larger crops each year. Physical changes include reduced defensive mechanisms like spines and thorns, the increased size of the inflorescence in which the seeds occur, larger seeds, and seed color changes as seed coats change from thick to thin and lose the seed coat with bad-tasting chemicals to deter predators.

An example of the increase in seed size can be seen in sunflower seeds, where wild and domesticated seeds occur side by side

The increase in inflorescence size is demonstrated by sunflowers where a dramatic difference can be seen in the small wild heads as compared to the large Hopi seed head. Amaranth offers a second example when the small wild seed spikes are compared with the huge red spikes of the 8-foot cultivated form.

Color changes in seeds of domesticates tend to shift from dark to light, with wild forms often having black seeds as seen in chenopods and amaranths. The thick seed coats give way to very thin pale ones through which the interior parts of the seed can be seen. Another example is provided by devil's claw (Proboscidea spp., Martyniaceae), which produces a capsule with a long beak that partially splits apart creating two reflexed slender ends that help disperse the black seeds by getting tangled around animal fetlocks. The long "claw" is highly valued as a black decorative element in basketry by O'odham basket weavers. In recent times the plant has been domesticated to achieve very long claws. Another result of domestication is that the seeds are now white. This is the only plant domesticated in the Southwest, as all of the others came north from Mexico.

5. Domestic devil's claw capsule and white seeds in the center

6. Wild and domesticated amaranth

A CAUTIONARY NOTE REGARDING COLLECTING WILD PLANTS:

When gathering wild plants to eat, it is very important to make sure that the identifications are absolutely correct to avoid eating a harmful or poisonous plant and getting sick. Use good local field guides, learn from an experienced elder or teacher, or take samples first to places where experts can help you such as the local County Extension office, the University of New Mexico Herbarium, a meeting of the New Mexico Native Plant Society, and the Rio Grande Botanic Garden.

If you do find plants you want to collect, please do not take too much. Wild plant populations can easily be overharvested, harming their ability to reproduce and even causing local extinction. Careful, respectful gathering will ensure that the plants can continue to provide for people for many years to come.

7. White Mountain Apache burden basket

WILD PLANT GUIDE

ACORN

Common Name: **Oak, Bellota**
Scientific Name: **Quercus emoryi, Q. gambelii, Q. macrocarpa, and many more**
Family: **Fagaceae**

Description:

Shrubs or trees with variably shaped leathery leaves, the most distinctive of which are lobed or incised. The fruit is the distinctive acorn that is partly enclosed by a scaly cap; they can vary considerably in size among the species. Identification of the many species is difficult due to frequent hybridization. Fruit production fluctuates considerably from year to year, with bumper crops available every 2 to 5 years. They are available from late summer well into the fall. Oaks can be found throughout most of New Mexico.

Ethnobotany:

Oaks can be divided into 2 broad groups, white oaks and red oaks. White oak acorns contain less of the bitter tannin that makes many acorns inedible without laborious processing. Two local New Mexico species, Gambel's and Emory oak, are white oaks that are very low in tannin and can be eaten raw. Both have been gathered by Native Americans and Hispanics. In southern Arizona, Emory acorns are sold in markets as "bellotas".

Acorn use was most extensive in California where the nuts were the staple food crop for many tribes, making up as much as half the diet. Families gathered hundreds of pounds to store in large granaries built of poles and brush with elevated platforms to discourage rodents and insects. After shelling and winnowing, acorns were processed into meal at milling sites consisting of expanses of flat bedrock in which cylindrical holes were worn by elongated pestle stones. Some of these bedrock mortar sites have many of these cups suggesting that women gathered together there to socialize while engaged in this common chore. Most of the species used required leaching to extract the tannin from the meal. The most common method was a leaching basin that looked like a short broad volcano. Excavated in loose sand, it was lined with pine needles or more recently muslin on which a half-inch thick layer of acorn meal was placed. Repeated rinsings with water were done until the desired taste was achieved. The meal was usually cooked in baskets using hot rocks to create a hearty mush.

Archaeobotany:

Direct evidence of acorn use is not common since the nuts are usually processed at locations away from the houses and cooking hearths that are usually investigated by archaeobotanists. Occasionally carbonized acorn shell fragments are found in hearths and midden deposits.

Health and Nutrition:

Acorns contain abundant fats and carbohydrates, with the proportions variable among species. A 100 gram portion of raw fresh corns contains approximately 387 calories with 24 gm of fat and 41 gm of carbohydrate. They are also a good source of vitamin B6 and folate as well as magnesium, potassium, copper and manganese. Although modest in quantity at 6 gm, acorn protein is high quality in terms of essential amino acids. Acorns also have a very low glycemic index of 23.

8. Q. macrocarpa, Burr oak tree

9. Cahuilla woman loading an acorn granary. Photograph courtesy of the Braun Research Library, Autry National Center of the American West. Los Angeles; LS.2652

10. Lucy Brown pounding acorns in bedrock mortar. Photograph courtesy of the Yosemite National Park Archives, Museum, and Library

11. Leaching acorn meal in Yosemite. Photograph courtesy of The Bancroft Library University of California, Berkeley

AMARANTH

Common Name: **Pigweed, Bledo**
Scientific Name: **Amaranthus palmeri and others (wild); A. hypochondriacus, A. cruentus (domesticated)**
Family: **Amaranthaceae**

Description:

Herbaceous annuals with diamond or lance-shaped leaves. Flowers form dense terminal prickly spikes that produce copious quantities of small black seeds in wild species. The plants appear with the onset of the summer rains, favoring disturbed soils such as roadsides, fields, and canal banks, and can be troublesome weeds. Domestic species can be quite large and robust, with some exceeding 7 feet in height. They produce large seedheads that can be buff-colored or bright red and are full of golden seeds. Their leaves are large and broad.

12. Wild amaranth with small inflorescence

Ethnobotany:

Wild amaranths provide a double crop of seeds and greens that were valued as foods by many Southwestern groups. Sometimes considered a staple food, the seeds could be gathered in quantity and boiled or parched and ground into meal and flour for mush, gruel, soup and dumplings. Young plants and tender leaves on older plants were eaten as potherbs, prepared by boiling or baking. They could be dried and stored for later consumption.

13. Powell's amaranth seeds

Domesticated species in Mexico and Peru were major dietary staples of the Aztec and Inca. Tribute lists from 1541 show that about 20,000 tons of seeds were sent to emperor Moctezuma each year. The seeds can be boiled or parched to make tasty popped grains. The grains were combined by the Aztecs with blood to make offerings to "pagan" gods, prompting Spanish authorities to suppress their use, nearly eradicating it. It was rediscovered in isolated parts of Mexico and has acquired considerable popularity due to its high nutritional value. Today vendors all over Mexico sell cakes of the popped grains and honey called "alegrias" or "happiness". The Hopi use a dark-seeded form of A. cruentus seeds to obtain a bright pink dye for piki bread. The young plants and leaves are also grown for food.

14. Domesticated amaranth

Archaeobotany:

Wild amaranths have been exploited for food in the Southwest for millennia. The seeds are one of the most commonly found plant remain in prehistoric archaeological sites throughout the region, reflecting their economic importance. Recent investigations have shown that domesticated amaranths were also used. Carbonized seeds are known from several Hohokam sites in the Phoenix and Tucson basins, and well-preserved pale seeds and spikes were found in a Salado cliff dwelling northeast of Phoenix. In New Mexico, a few of the seeds were recovered from an Ancestral Pueblo site in Ranchos de Taos.

15. Domesticated grain amaranth seeds

Health and Nutrition:

Nutritional data for wild and domestic amaranth seeds suggests that they compare favorably in protein and carbohydrate content with conventional grains. More importantly, their proteins complement those in corn, as they provide the essential amino acid lysine in which corn is deficient. The seeds are also gluten-free. The leaves of both wild and domestic forms are excellent sources of protein, calcium, iron and vitamin A.

16. Grain amaranth seed and popped seeds

CHENOPODS

Common Name: **Goosefoot, Lamb's Quarters, Wild Spinach, Quelites**
Scientific Name: **Chenopodium berlandieri, C. ambrosioides, C. quinoa, and more**
Family: **: Chenopodiaceae**

Description:

Herbaceous annuals with triangular or rhomboid leaves with entire or toothed margins that resemble a goose's foot. Tiny flowers are concentrated in tight bunches forming aggregates of abundant tiny seeds that are black in wild species and cream-colored in the domesticate C. quinoa. More than a dozen species grow in New Mexico at elevations up to 8,000 feet. They favor open disturbed habitats and are often viewed as weeds. They tend to appear with the summer rains, with some species continuing until the first frost.

17. Wild Goosefoot plant

Ethnobotany:

Wild chenopods have, like amaranth, been used for their seeds and herbage. Although tiny, the seeds can be gathered in large quantities. They are easily stripped from the stems and can be winnowed, parched and eaten or ground into meal for mush and bread. The young plants are often encouraged to grow in and around traditional fields where they and tender leaves can be harvested during the growing season for tasty potherbs. The plants are still harvested by Native American and Hispanic New Mexicans who boil or fry them with onions and chile. A cultivated species, epazote (C. ambrosioides), is often used by Hispanic cooks as a flavoring, especially with beans.

A South American domesticated grain chenopod, quinoa (C. quinoa), became one of the 3 staple foods of the Inca along with maize and potatoes. Today quinoa continues to be an important traditional food crop in Peru, Ecuador, Bolivia and Chile and is now increasingly available commercially here in the United States.

18. Wild C. glaucum seeds

19. Domesticated Quinoa seeds

Archaeobotany:

Like amaranths, chenopods appear in the Southwestern archaeological record for thousands of years. They are one of the most commonly encountered carbonized seeds in prehistoric sites, consistent evidence of their importance across time and space. In the eastern United States a domesticated form of chenopod was developed as part of a starchy-seed complex that, like sunflower, was an important component of the pre-maize food production system of the Hopewell Culture, sustaining a significant population until maize ascended to primary importance sometime around AD 1000. This domesticate has become extinct.

20. Mature quinoa plant. Photograph courtesy of Quinoa Corp.

Health and Nutrition:

Cooked lamb's quarters leaves are low calorie, with a 100 gm portion at 32 calories with 3 gm of protein, 5 gm of carbohydrate and 1 gm of fat. It is an excellent complete protein source and provides exceptional amounts of vitamins A, C and K and significant quantities of calcium and manganese. Cooked quinoa grain is low fat, gluten free, and has a low glycemic index of 10. A 100 gm portion contains 120 calories, just 2 gm of fat, 21 gm of carbohydrate, and 4 gm protein, witth a protein percentage of about 16 percent that exceeds most grains, reaching as high as 20 percent in some varieties. The protein quality is excellent with high amounts of all essential amino acids. It is a good source of manganese, also phosphorus, magnesium, folate, and fiber.

21. Quinoa seeds

CHOLLA

Common Name: **Cholla cactus**
Scientific Name: **Cylindropuntia spp.**
Family: **Cactaceae**

Description:

Unique perennial succulent cactus consisting of cylindrical jointed stems covered with multiple bumps or tubercles, each of which bears a spine cluster. Flowers appear in the spring and summer, and exhibit a range of colors that includes red, purple, pink, orange, and yellow. The flowers are replaced by distinctive egg-shaped fruits that may or may not bear spines and has a conical depression at the top. Chollas are wide-spread throughout the Southwest and New Mexico.

22. Large cholla plant

Ethnobotany:

Cholla provides several edible products, the most important of which is the unopened flower bud. Chollas were among the first plants to provide substantial spring food for people whose stored winter foods were usually nearly depleted or gone. Often buds were available in large quantities, helping to keep starvation at bay until other plant foods were ripe.

Among the O'odham of southern Arizona, buds were gathered from March into May, the available quantities correlating with the amount of winter rainfall. Traditional wooden tongs made of paired mesquite branches or saguaro cactus ribs tied at one end were used to safely pick the spine-covered unopened buds. The buds were placed in a roasting pit and baked for approximately 18 hours. The roasted buds were placed on racks or screens to dry, after which they were rubbed with sticks to remove the fine spines, and then winnowed. The buds could then be stored indefinitely in pottery vessels or glass jars. The dried buds were prepared either by boiling to rehydrate or grinding them into meal and boiling it in water with other ground meals such as maize, saguaro cactus seed or wheat. They taste a bit like artichokes. The fruits of several cholla species could be eaten, although they were not as popular as the sweet fruits of the prickly pear cactus. Tender young stem joints could also be eaten after roasting.

23. Walking stick cactus buds and flowers

Archaeobotany:

Evidence for the use of cholla buds by prehistoric cultures primarily consists of accidentally carbonized buds discovered in burned structures. They have been found in a number of Hohokam sites in southern Arizona, often in association with the broken ceramic pots in which they had been stored. Here in New Mexico they have been identified in the vicinity of Farmington at Salmon Ruin, an 11th century Ancestral Pueblo village.

Recent studies of cholla population distributions in northern New Mexico revealed that cholla is growing outside of its natural range in association with archaeological sites, suggesting that the site residents had brought the stem segments back to plant near their homes in order to have a reliable bud supply as well as formidable fencing!

24. Carbonized cholla buds trom southern Arizona Hohokam site

Health and Nutrition:

Cholla buds contain small quantities of protein and carbohydrate and are very low in fat. They offer significant amounts of magnesium, manganese and selenium, and a small quantity of iron. Their most important dietary contribution is calcium, as a 100 gm serving contains more of this critical mineral than 8 ounces of milk.

25. Young cholla buds

HARVESTING AND PROCESSING CHOLLA CACTUS BUDS

A contemporary O'odham (Pima) Cholla bud roast conducted in the mid April, 1978. An area with a high density of Cholla plants was chosen. Women gather the buds using either metal or traditional wooden tongs, twisting the buds off the plant. After about five hours of gathering almost two bushels of buds were gathered. A roasting pit was dug and lined with river cobbles. A mesquite wood fire was built in the pit to heat the rocks. Seepweed, a salty chenopod, was placed in the pit, the buds were poured in and another layer of seepweed was placed on top followed by a canvas and soil to retain steam in the pit. After about 18 hours of roasting, the cooked buds were removed and spread on screens to dry in the sun for one week. When dry the spines were removed by rubbing the buds on the screens with sticks followed by winnowing. Upon completion of the processing the buds are ready for storage.
Photographs courtesy of Ruth Greenhouse.


A. Collection Site


B. Picking buds with wooden tongs


C. Harvesting buds


D. Day's harvest of two bushels


E. Roasting pit rock lining


F. Buds placed in the pit


G. Pit sealed with dirt


H. Removing the cooked buds


I. Roasted buds up close


J. Rubbing off spines in drying screens


K. Winnowing the dry buds


L. Basket of roasted buds

PURSLANE

Common Name: **: Purslane, Pusley, Verdolagas**
Scientific Name: **Portulaca oleracea, P. retusa**
Family: **Portulacaceae**

Description:

Small, ground-hugging succulent annual plant with red stems, small elongated leaves, and tiny yellow flowers. Produces very small apostrophe-shaped black seeds covered with tiny tubercles in capsules that open around the equator, allowing the "lid" to fall off. Found in disturbed open soils with full sunlight, appearing in late May and early June and continuing into the fall. It can be an aggressive garden and field weed.

26. Portulaca growing in sidewalk

Ethnobotany:

Purslane offers 2 edible products: the fleshy plant and the tiny seeds. Historically the leaves were eaten by the Hopi and used for a medicinal tea by the Acoma and Laguna. The Acoma, Keres, Chiricahua and Mescalero Apache, Navajo, Tewa, Laguna, San Felipe, and Isleta cooked the plants, with the dried plants stored as a winter food by the Isleta. Purslane has also been widely used by Hispanic cooks as a popular green vegetable and is sometimes sold in markets as "verdolagas". The seeds were consumed by the Navajo and Zuñi. The plant is eaten both fresh and dry in many parts of the world.

27. Purslane seeds

Archaeobotany:

Evidence for the past consumption of the plant itself is unavailable at present. However, carbonized purslane seeds are frequently recovered from prehistoric sites throughout the Southwest, an indication of the continuing popularity of the plant over the centuries.

Health and Nutrition:

Purslane is emerging as a nutritional powerhouse. Extensive research by A. P. Simopoulos has shown that it contains exceptionally high levels of Omega-3 fatty acids, which are essential for normal growth and development and may play an important role in the prevention and treatment of coronary artery disease, hypertension, diabetes, arthritis, other inflammatory and autoimmune disorders, and cancer. The leaves also contain melatonin, which stimulates antioxidant enzyme production, has anti-inflammatory properties and inhibits cancer growth. For a 100 gm portion, purslane contains 2.0 gm of protein, 5.0 gm of carbohydrate, and 0.4 gm of fat. It is very low in calories and is a good source of thiamin, niacin, vitamin B6, folate, vitamins A and C, riboflavin, calcium, iron, potassium, manganese and magnesium.

28. Young purslane plant with flower

30. Magnified purslane seed

29. Purslane growing out of sidewalk

SUNFLOWER

Common Name: **Sunflower, Mirasol**
Scientific Name: **Helianthus annuus**
Family: **Asteraceae (Compositae)**

Description:

Tall conspicuous annual plants with large triangular leaves that bear single large showy yellow flower heads at the end of sturdy stems. These iconic plants of summer are found throughout NM (and the Southwest) in disturbed soils such as roadsides, fallow fields, and in shallow swales. Seeds are produced in quantity on a large flat disc or head. The "seeds" are actually fruits (achenes) with a shell and the seed or kernel inside, each of which develops in a single flower on the head. Most of the tiny flowers lack petals, but those around the head perimeter do have a single large colorful petal, which collectively create the illusion of a single very big flower.

31. Wild sunflower plant

Ethnobotany:

Sunflowers were widely used by Southwestern peoples. The ripe seed heads were gathered, crushed and winnowed to release the small seeds. They could be eaten raw, but were more commonly parched, lightly ground and winnowed to remove the shells, and then ground into meal or an oily paste. The meal could be eaten as is, or made into soup, mush, gruel, gravy and dumplings, or baked on hot rocks or gridddle stones into bread and cakes. The kernels could also be ground into a paste that was described as being like peanut butter. The seeds were prized for their high oil content because fats were a scarce commodity for people lacking access to dairy products, livestock, and commercial oils.

32. Daisy Aster gathering sunflower seeds, fall 1969. Photograph courtesy of University Archives, University of Nevada-Reno

Selection by several Southwestern societies has resulted in the creation of distinct landraces of sunflowers such as the all white fruits of the Tarahumara of Chihuahua, Mexico, and the deep purple-hulled Hopi fruits that are used to dye basketry elements. Today, sunflower seeds are a popular snack food and a widely cultivated crop for commercial sunflower oil.

Archaeobotany:

The oldest known sunflower fruits in a cultural context come from an Olmec site in Tabasco, Mexico, where 3500 year old carbonized remains showing evidence of domestication were recovered. In the eastern United States, sunflowers were domesticated as part of a suite of oily seeds that helped sustain large populations living around platform mounds along the Mississsippi River and its tributaries before corn became a staple food. In the Southwest, carbonized fruits and seeds are recovered from food-related contexts such as cooking hearths and trash deposits.

33. Apache sunflower

A modest number of graphic representations of sunflowers suggests that these plants were held in special regard by regional prehistoric inhabitants, most likely because of their obvious relationship with the life-giving sun. A shallow bowl obtained from a Hohokam village in Tucson, AZ, that dates to AD 500-700 is the most spectacular of just a few decorated ceramic vessels portraying sunflowers.

Health and Nutrition:

The high fat content of sunflower seeds makes it a high energy food. A nutritional assay for commercial seeds shows that a 1-oz or 28 gm serving has 166 calories, of which 120 (72 percent) are from fat. In addition to 14 gm of fat, carbohydrate and protein each contribute 6 gm. They are a good source of several vitamins and minerals including vitamins E and B6, thiamin, niacin, riboflavin, folate, iron, magnesium, phosphorus, zinc, copper, manganese and selenium.

34. Hohokam sunflower bowl from Tucson, Arizona

WILD PLANT UPDATES

AGAVE

Common Name: **Agave; Mescal; Century Plant**
Scientific Name: **Agave spp.; A. palmeri; A. parryi**
Family: **Agavaceae**

The agave is NOT a cactus. It is a stemless succulent with long spine-tipped pointed leaves bearing sharp teeth along the margins. After several years, the plant sends up a tall flower stalk after which it dies. Just prior to forming the stalk, the plant amasses a large food reserve that will provide the energy needed to develop the stalk. It is at this optimal time in the spring that people throughout the Southwest gathered the plant using wooden chisels. The leaves were trimmed off, leaving a basketball-sized raw heart that is toxic due to abundant calcium oxalate crystals. The heads were placed in a roasting pit lined with cobbles in which a fire burned down to coals, covered with dirt, and roasted for 1-3 days. Heating in the pit neutralizes the calcium oxalate and results in a product that is very sweet with a molasses-like flavor. The soft pulp could be pounded into sheets and sun-dried, after which it could be stored indefinitely. Called mescal, the dried heart was a valuable trade commodity, as there were no other comparable sources of sugary food. Mescal is nutritious, with 375 calories per 100 gm portion, 4.6 percent protein, 81 percent carbohydrate, and 1.0 percent fat. It is also a good source of calcium. Agave nectar, the sap of the plant collected after the removal of the young stalk, is a new commercial sweetener that has a much lower glycemic index than sugar or honey, making it a better choice for diabetics.


35. Emerging flower stalk


36. Agave "cabeza" showing heart and leaf bases

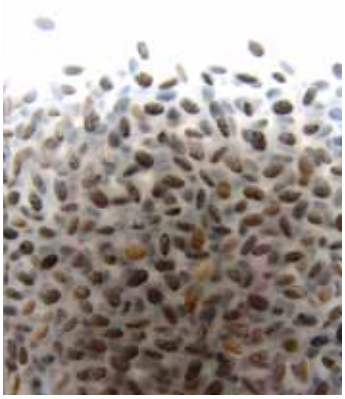

37. Cooked agave heart and leaves

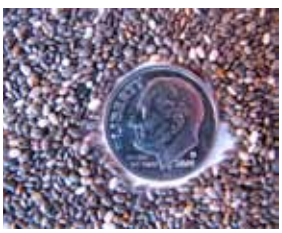
CHIA

Common Name: **Chia, Sage**
Scientific Name: **Salvia columbariae, S. hispanica**
Family: **Mint family (Lamiaceae)**

Long dismissed as a silly Christmas novelty, chia of "ch-ch-ch-chia pet" fame has recently emerged as a superfood with growing commercial interest. Before this, the small seeds of herbaceous annual species in the sage genus were important foods of traditional peoples in the Southwest, California and Mexico. In Mexico the plants were cultivated for the seeds, which were a tribute commodity sent to the Aztec emperor Moctezuma. In the Southwest and California, wild species were exploited. The seeds are unusual in that they exude a gelatin-like mucilage after immersion in water, which was used by Native Americans, Hispanics and Anglos to make a refreshing beverage. Rich in protein and oil, a 100 gm portion contains 350 calories, 21 gm of protein, 42 gm of carbohydrate, and 33 gm of fat. The oil is an excellent source of Omega-3 fatty acids, exceeding the level in flax seeds. It is high in insoluble dietary fiber and has a low glycemic index. It has higher antioxidant levels than blueberries and is an excellent source of vitamins and minerals such as phosphorus, potassium, magnesium, iron and zinc, and has exceptionally high levels of calcium. Growing demand has resulted in larger scale cultivation of the Mexican species and a growing number of chia products on supermarket shelves.


38. Commercial field of S. hispanica Aztec Chia


39. Chia seed mucilage


40. Chia seeds

CHIMAJÁ

Common Name: **Wild celery; Chimajá**
Scientific Name: **Cymopterus fendleri**
Family: **Carrot Family (Apiaceae)**

Wild celery is an unobtrusive root perennial that appears in the spring. Dark green triangular dissected leaves appear first, followed by bright yellow flowers and papery winged fruits. The leaves and the deeply buried starchy root are edible, with the leaves a popular gathered product by Hispanics and Native Americans. Judicious removal of a couple of leaves per plant allows the plants to continue their cycle without harm. The leaves can be used fresh or preserved by drying or freezing for later use, and are especially good cooked with onions and scrambled eggs. They have a strong pleasant flavor reminiscent of parsley and celery combined. They are nutritious as well, with a 100 gm portion containing 189 calories, 36 gm of protein, 44 gm of fiber and 5 gm of fat. In addition, they offer significant quantities of magnesium, phosphorus, iron, zinc and copper and exceptional amounts of potassium and calcium.

41. Chimajá plant

43. Leaves and root

42. Excavating the edible root

DROPSEED GRASS

Common Name: **Dropseed grass; Zacaton**
Scientific Name: **Sporobolus spp.; S. cryptandrus**
Family: **Grass Family (Poaceae)**

Dropseeds are perennial bunchgrasses that produce abundant small "seeds" or caryopses that are easily stripped from the plants. Unlike many grasses, the chaffy bracts that enclose each grain readily fall away, making it easy to winnow the seeds. Despite their small size, the grains have been a staple food for several Western tribes. The grains could be eaten raw or parched and were usually ground to make mush or bread or to flavor cornmeal. Available nutritional data are incomplete but indicate that a 100 gm portion contains 10 gm of protein, 2.5 gm of fat and 27 gm of crude fiber. Also included are appreciable amounts of calcium and phosphorus.

44. S. giganteus spike with seeds

46. S.cryptandrus seeds

45. S. cryptandrus plant

MESQUITE

Common Name: **Mesquite; Screwbean mesquite, Tornillo**
Scientific Name: **Prosopis spp., P. pubescens**
Family: **Bean Family (Fabaceae)**

Mesquites are spiny shrubs or large trees with leaves composed of small opposed leaflets. They produce often large quantities of long thick-walled beans in the late spring and summer that were a staple crop for southern desert dwellers like the O'odham and Mojave. Huge amounts were stored in large platform or rooftop granaries made of thick coils of grass that looked like giant baskets. After parching and drying, the beans were pounded in wooden mortars with a pestle to free the seeds and hard endocarps or seed cases from the sweet sticky fruit wall. The meal was made into beverages, gruel or mush, and ash-baked cakes that could be stored. Mesquite meal is a high-energy food, with 368 calories per 100 gm of meal. The meal has a low glycemic index of 25, making it a slow release food that is good for diabetics. Fresh beans contain 232 calories with 8 gm of protein, 2 gm of fat and 48 gm of carbohydrate. A second type of mesquite bean has a smaller, tightly coiled bean that has resulted in the name screwbean mesquite.

47. Screw bean mesqite

48. Mesquite tree with man standing by trunk

49. Mesquite beans, endocarps, and seeds

PIÑON

Common Name: **Piñon Pine**
Scientific Name: **Pinus edulis**
Family: **Pine Family (Pinaceae)**

Piñon pines are small cone-bearing trees that produce often abundant crops of sweet flavorful nuts in the fall. They were a staple food for many groups, and their sweet flavor still draws gathering parties as well as casual pickers. Commercial ventures have also harvested the nuts in bumper crop years such as 1921, when thousands of pounds filled more than 25 boxcars in Santa Fe bound for eastern destinations. The roasted shelled nuts could be eaten as is or made into an oily meal for cakes, soup, and gruel. A high energy food, a 100 gm portion of nuts contain 671 calories, most of which comes from fat. It contains 15 gm protein, 65 gm fat, and 7 gm of carbohydrate. One study found that a pound of shelled nuts has nearly the same number of calories as a pound of butter. The nuts also offer potassium, calcium, vitamin A, thaimin, folate, iron and phosphorus. The protein is especially valuable as it is complete, containing 20 essential and non-essential amino acids.

50. Women gathering pine cones with hooked stick. Photograph courtesy of University Archives, University of Nevada-Reno

51. Wuzzie George winnowing pine nuts. Photograph courtesy of University Archives, University of Nevada-Reno

52. Nuts and roasted shelled piñones

PRICKLY PEAR

Common Name: **Prickly Pear; Nopal**
Scientific Name: **Opuntia spp.**
Family: **Cactus Family (Cactaceae)**

Common throughout the Southwest, prickly pear cactus is a perennial succulent with distinctive flattened stem segments that look like paddles. Egg-shaped red fruits appear in the summer. Although both pads and fruits bear spine clusters, they have been used for food by many Southwestern cultures. The juicy fruits can be eaten raw or cooked, and were dried for later use. The despined young pads can be sliced and eaten raw or after boiling. Like okra, they contain abundant mucilage. Canned pads or "nopalitos" can now be found in many mainstream markets. They are delicious cooked with onions and scrambled eggs. The fruit is a low calorie food with 41 per 100 gm and 0.73 gm of protein, 0.51 gm of fat and 10 gm of carbohydrate, modest amounts of calcium, potassium, magnesium, vitamin C and beta carotene. The cooked pads contain 15 calories per 100 gm along with 3gm of carbohydrate, 0 gm fat and moderate quantities of calcium, manganese and vitamins A and C. The insoluble mucilage contributes to a very low glycemic value of less than 10.

53. Prickly pear plant with fruits

54. Fresh prickly pear pads sliced to cook

RICEGRASS

Common Name: **Indian Ricegrass**
Scientific Name: **Achnatherum hymenoides (= Oryzopsis hymenoides)**
Family: **Grass Family (Poaceae)**

Ricegrass is an attractive perennial bunchgrass that grows throughout the West. The exceptionally large grains produced and the easily removed chaff made this grass a staple food for many groups past and present. The seeds were parched and then stored or ground into meal to make mush, gruel or cakes. The Owens Valley Paiute planted and tended stands of ricegrass, often harvesting large crops. Today it is commercially grown in Montana by the Amazing Grains Growers Coop as a gluten free flour alternative. Ricegrass is an excellent nutrient source and low fat food with 360 calories in a 100 gm portion of flour, just 15 of which are from fat. It also contains 17 gm of protein, 3 gm of fat, and 70 gm of carbohydrate. It also provides 24 gm of fiber and 40 percent of the recommended daily iron requirement.

55. Ricegrass plant

57. Ricegrass seeds

56. Western Shoshone gather bunches Indian rice grass into a large pile and thresh it with sticks. Photograph by Julian Steward, courtesy of the University of Illinois Archives.

58. Picking prickly pear buds with traditional wooden tongs. Photograph courtesy of Ruth Greenhouse

The social and economic significance of this desert food is revealed in the comments of a Tohono O'odham woman elder named Chona with whom anthropologist Ruth Underhill collaborated in the 1930s:

"There was a kind of cactus called cholla, and when its buds were green we all went and stayed for many days picking them, up in the hills…. They broke off the new stems with tongs and rolled them around on the ground to get the thorns off, and then baked them all night in a big pit. They smelled fresh and fine when they came out. When the big pit was roasting slowly in the night, the women threw green cholla stems on the campfire ashes to cook. We pulled them out, knocked off the thorns, and ate them hot. Ah, good, good food! We ate nothing else for those three weeks. Green things!" (Underhill 1979:39-40).

59. Traditional wooden tongs. Photograph courtesy of Ruth Greenhouse

RESOURCES

Publications

Greenhouse, R., R. E. Gasser and J. W. Gish. 1981. Cholla bud roasting pits: an ethnoarchaeobiological example. The Kiva 46(4):227-242.

Lanner, R. M. 1981. The Piñon: A Natural and Cultural History. University of Nevada Press, Reno.

Ortiz, B. 1991. It Will Live Forever, Traditional Yosemite Indian Acorn Preparation. Heyday Books, Berkeley.

Simopoulos, A. P. 2004. Omega-3 Fatty Acids and Antioxidants in Edible Wild Plants. Biological Research 37:263-277.

Underhill, R. M. 1979. Papago Woman. Waveland Press, Inc., Prospect Heights.

Websites

Native American Ethnobotany Database: http://herb.umd.umich.edu/
National Institute of Diabetes and Digestive and Kidney Health: http://www2.niddk.nih.gov/
Nutrition Data website http://www.nutritiondata.com
Omega 3 Chia seeds http://www.chiagrowers.org
Quinoa Corp: http://quinoacorp.org
The Glycemic Index Website: http: http://www.glycemicindex.com
USDA NRCS Plants Database: http://plants.usda.gov/

Ethnobotany Events

Living Desert Zoo and Gardens State Park Annual Mescal Roast, in May, Carlsbad, NM: http://www.emnrd.state.nm.us/prd/MescalRoast.htm
Malki Museum Agave Harvest and Roast annual event, Banning, CA: http://www.malkimuseum.org/

Some Albuquerque Sources for Products:

Talin International Market, Café Istanbul, El Mezquite Market, La Montanita Coop, Pro's Mexican Market

Mail Order Products:

A & J Family Farms Mesquite and Prickly Pear products: http://www.socorro-nm.com/A&J-farms.htm
Chia seeds: Omega 3 Chia seeds http://www.chiagrowers.org
Cholla buds, Saguaro cactus products: http://tocaonline.org
Montina rice grass flower: http://www.amazinggrains.com
Mesquite flour, popped amaranth, and traditional crop seeds Native Seeds/SEARCH http://www.nativeseeds.org
Quinoa: http://quinoacorp.org

60. Bowl of tender young chenopod shoots

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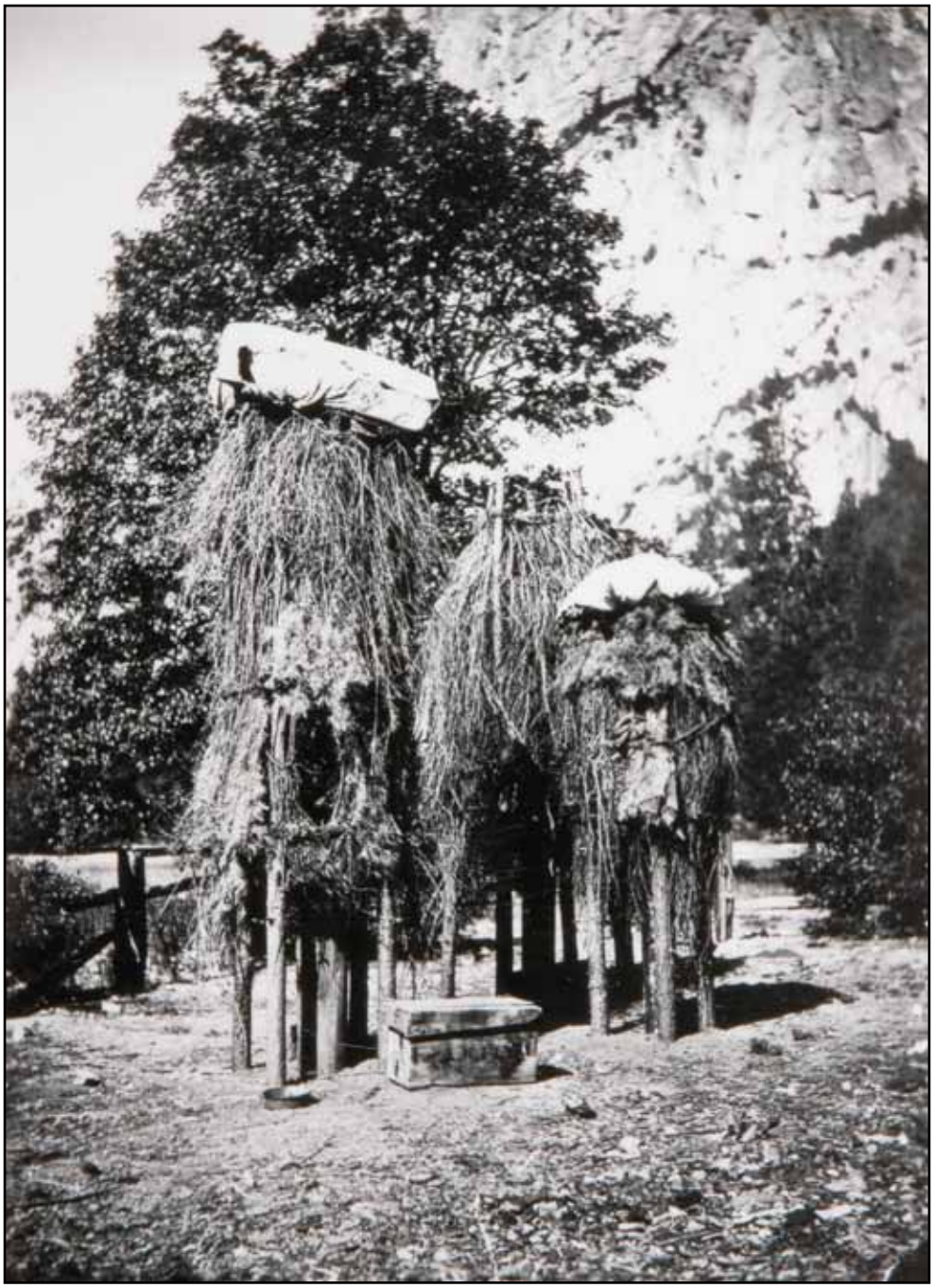

61. Acorn graneaies. Braun Research Library, Autry National Center of the American West, Los Angeles; p.399A

A PLACE AT MOTHER EARTH'S TABLE VOL. II
IS MADE POSSIBLE BY:

AUTHOR: LISA W. HUCKELL
GRAPHIC DESIGN: MARY BETH HERMANS & EMMA DIFANI
PRINTING: THE PRINTED IMAGE