Surrounded by Food

Written and Illustrated by Ann Audrey

Introduction

When I came to Arizona in the summer of 1970, the dry, hot desert seemed the antithesis of a land of abundance. For years I dug into the bare Arizona dirt, plunking various inappropriate tomato species in the ground, and grudgingly ate the 4 or 5 small hard fruits they yielded. After struggling 20 years with the wrong food paradigm, I learned about the traditional survival strategies of the many indigenous peoples of the southwest who for centuries lived sustainably in the desert.

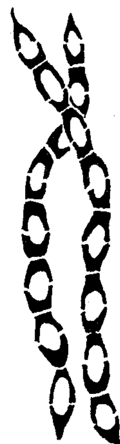
In the last century, members of the Tohono O'odham maintained themselves on a combination of native plants, nondomesticated animals, and crops cultivated in the mouths of arroyos using ephemeral flood waters. Commonly used native plants included the fruits of saguaro and organ pipe cactus, cholla buds and fruits, mesquite pods, ironwood and palo verde seeds, native greens, and sand root (1). On average, a Tohono O'odham family in the late 1800s cultivated from one-fourth to two acres of land to supplement their native food supply (1). Cultivation made up to one-third of a family's sustenance at that time, while anciently, it provided only one-fifth of their total food supply—an impressive testimonial to the abundance of native plants and animals (1). The Seri, Pima and Apache also used native plants extensively, as did the many other peoples who lived in these arid lands.

To get the detailed information you will need to harvest and process desert plants, reading is a good place to start. There are a number of useful books describing native plant use, a handful of which are the basis for this article and are listed at the end. In particular, Carolyn Neithammer's book *American Indian Food and Lore, 150 Authentic Recipes* (2), is excellent. She describes how to harvest and prepare desert plants and includes recipes for their use. Recipes can also be found in *Fruits of the Desert*, by Sandal English (3). It is important when you harvest plants to go with someone who knows plant species very well; never eat anything if you do not know exactly what it is, some desert plants are toxic! When taking on spines, caustic latex juice, and new tastes and textures, there is no substitute for mentors and comrades in the adventure.

Use of native plants requires respect for the land and plants. Fruits and seeds can generally be used without damaging the plants, but leave plenty for the animals who depend on these for their food supply. Harvesting an entire plant, such as the agave, is best done on your own land or that of a friend, leaving plenty of plants for the next person. I have described just a few of the many edible plants below, a list is provided at the end of more plants that were used by native people.

MESQUITE

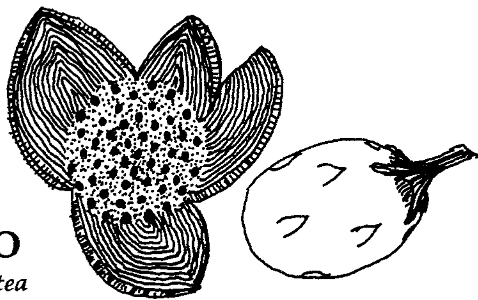
Prosopis juliaflora = glandulosa (honey mesquite)
P. velutina (velvet mesquite)



Historically, mesquite was an especially important food source for sustenance in the desert southwest. Mesquite pods and seeds were used by the Yuma, Mohave, Cocopa, Pima, Tohono O'odham, Maricopa, and to a lesser degree, by the Acoma, Laguna and Yavapai people (2). These common trees are located in desert lowlands and washes. With tap roots that can reach down 150 feet to groundwater supplies, mesquites are not as affected by the vagaries of climate as shallow-rooted plants. Pods ripen throughout the summer, and there is sometimes a second crop in the fall, following the summer rains. Each tree produces an abundant crop of sweet tasting, fibrous seed pods housing a string of very hard seeds. The ground underneath a fruiting mesquite tree is littered with the long, yellowish pods. Mesquites shelter humans and animals alike, providing welcome shade in the summer and supporting a guild of understory plants. The native mesquite tree is deciduous, letting the sun penetrate in the winter but shading in the summer.

Mesquite as food: Harvested ripe mesquite pods were traditionally dried and stored in cylindrical granaries. A large part of a woman's day could be spent grinding the pods and seeds for use in gruel or a sweet drink. Sweet, ripe mesquite pods can be chewed right off the tree; the fibrous part of the pods and hard seeds are spit out. Dried pods and seeds can be ground into a meal and used as flour to make bread, mush or cakes. The pods can also be boiled with water, then strained. The water solution is cooled and makes a refreshing, nutritious drink. Mesquite pods contain protein, carbohydrate and calcium. Four tablespoons of ground meal provides 70 calories (2). A number of recipes are available for mesquite including gruel, broth, dumplings, pudding, meal and breads (2), plus coffee cake, popovers, cupcakes, butter, and jelly (3).

Other uses for mesquite: Traditionally, cordage was made from mesquite roots, basketry material was made from the inner bark, and mesquite pitch was used to make paint, mend pottery, and dye hair (2)(4). Though limbs are often crooked, the wood is very strong and can be used for house and fencing structures and makes good firewood. Use of mesquite flowers by bees results in an excellent-tasting honey.



SAGUARO

Carnegiea gigantea

The shallow, lateral roots of a saguaro extend horizontally outward to form a radius as wide as the plant is tall (5). With this extensive root system, a saguaro can absorb a large amount of water from rainfall, then store it in its accordian-like trunk. Saguaro trunks swell when water is available and contract as the water is used up, efficiently equipping the plant to flower and fruit even in drought years. Flowers appear on the plant in May and produce fruit five or six weeks later in June, in time for the seeds to germinate with the summer rains. One fruit can contain as many as 2000 seeds, and a single plant may produce 40 million seeds in a lifetime, a prodigious output that ensures that at least some plants will germinate and survive both predators and harsh climatic conditions (4). The Tohono O'odham so valued the saguaro fruit, the time of harvest was the start of their yearly calender. The harvest season takes place right before the rains in June. With a long pole made of saguaro ribs, the fruits were knocked from the tips of saguaro arms and collected below. A portion of the gathered saguaro fruit was made into wine to be used in a ceremony to encourage the summer rains.

Saguaro as food: The deep scarlet-colored saguaro fruits taste sweet and are very filling and satisfying. Fruits can be eaten fresh as well as processed for later use. Traditionally during the annual saguaro harvest, the fruit pulp was removed from the rigid husks and collected in buckets, then taken back to temporary family harvesting camps. The discarded husks were left like small boats with the red insides facing up to encourage the rains. Back at the camps, the fruits were boiled with an equal amount of water to separate the sweet juice from the seeds and pulp. Straining the boiled mixture through cloth or screen finished the separation step. The syrup was then boiled down to the desired thickness and later made into wine.

Following these same steps today, you will garner ample syrup from a day's collection of fruit. The pulp and seeds are dried out in the sun; but you will need to keep the persistent ants away during the drying process. After the pulp and seeds are well dried, you can separate the seeds by shaking them free of the pulp. The pulp can be made into a jam by mixing with syrup and cooking it down, or ground and added to flour to make a sweet-tasting bread. The seeds can be ground. They are crunchy but not particularly hard, and are a beautiful reddish-black color. Ground seeds can be used in bread or porridges. Saguaro fruits have about 34 calories per fruit and are high in protein, vitamin C, potassium and calcium (2)(4). Recipes using fruit and seeds are available for pudding, bread, candy, gelatin salad, jam and jelly (2). Additional recipes include chiffon pie, sundaes, syrup and dried fruit (3). For a more detailed description of saguaro harvesting and processes, see Emma Hardesty's article in *PDJ 20.* While saguaro fruit is the most important food from the saguaro, the large white saguaro flowers can also be used to make a gruel (6).

***Other uses for saguaro*:** Saguaro ribs from fallen, decomposed cacti are long sturdy sticks which can be used for building materials and for making long poles for collecting saguaro fruit.

AGAVE

Agave palmerii, A. parryi, A. murpheyi

One quiet hour in an agave grove changed forever my perception of how plants move. This grove was both an agave nursery and graveyard, dominated by members of the community in the prime of their life cycle. Vegetative clones—pups—crowded the mother plants, inching out across the land. But just before the end of the mature plants' lives, giant flower stalks push up, garnering stored water and nutrients from the fleshy leaves to fuel growth of up to a foot a day. The lofty stalks are topped by flowers attracting native pollinators. Once seeds form, the giant flowering stalks dry and fall, taking steps of 10 feet or more, seeds scattering with the fall. One step can take as long as 30 or 40 years. In this grove, the footprints of fallen agaves stretched out a hundred feet in every direction.

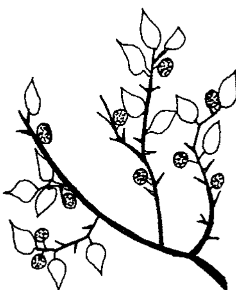
Agave were a delicacy to people living sustainably in the southwest desert. Collected in the spring and summer, the hearts of the agaves were roasted in large pits, the remnants of which are still evident in the piedmont areas where agaves grow. Because intense labor was involved in the harvest and roasting, agave hearts were valuable trade goods. Agaves were used by Indian groups throughout the southwest, and were a staple food of the Mescalero Apaches (2). Agave plantations appear to have been cultivated by the ancient Hohokam, the remnants of which are still evident in the desert, as described by Gary Nabhan in *PDJ 23*. In this case, the species was *Agave murpheyi*.

***Food uses for the agave*:** When harvesting agave be careful not to get the irritating latex-like plant juice on your skin; gloves and long-sleeved shirts, long pants and shoes that cover the body are recommended. (The irritating qualities are negated by the roasting process.) *Raw agave should never be eaten; it is poisonous (2)*. The mature plant is pried up at the base using a pole with a flattened, sharpened tip. The outer leaves are whacked off with a machete, leaving a core that could be a foot or more in diameter with leaf stubs attached. This is the heart, and it was traditionally cooked in a large roasting pit, along with the other hearts collected that day. The pit was lined with large flat rocks heated by building a fire over them. After the fire burned down, wet grass was placed over the rocks, after which the agaves were placed in the pit, covered with grasses, heaped over with dirt, and left to cook for one or two days. Agaves came out of the pit ready to cool and eat. When eaten fresh from the roasting process, the fibrous leaves could be chewed and the cud spit out. The base of young center leaves and the heart of the large crown of the plant is a fiberless pulp. This pulp could be scooped out and used or dried for later use. Agave recipes include baked agave; plus syrup, nutbutter, and chiffon pie with agave as an ingredient (2). Agaves contain calcium and trace minerals. *Agave palmerii* and *A. parryi* are recommended for cooking as they have relatively fleshy leaves and are not as caustic as other species, though they are still irritating and require the protective clothing listed above (2). The large blue-green colored agaves (*Agave americana)* commonly used as landscaping plants are not suitable for cooking (3).

Other uses for agave: Dried agave stalks were used for construction. Agaves were also a source of fibers used to make very strong cordage, sandals and hair brushes (4).

DESERT HACKBERRY

Celtis pallida



Desert hackberries ripen in late September. The amount of fruit on this thorny shrub will reflect the amount of water the plant has received...the more water the more berries.

Food Uses for Desert Hackberry: The berries can be eaten fresh. They can also be ground or mashed and shaped into small patties and dried. The berries themselves will dry and shrivel like raisins, and can be eaten this way as well (the seeds are edible). Recipes include jam, sauce and bread (3). Niacin and magnesium are available from these fruits (4).

Other Uses for Desert Hackberry: Hackberry wood was considered good wood for making bows and cradle boards.

CHOLLA

Opuntia acanthocarpa
(buckhorn cholla)
***O echinocarpa* golden cholla)**
***O. whipplei* (whipple cholla)**
***O. versicolor* (varicolored cholla)**

Cholla are intimidating cacti. Thickly armored with piercing spines, they seem impenetrable by anything but the brave birds who manage to build nests in their midst. Nevertheless, cholla buds were an important food in times past. In late April and May, the flower buds are ready to gather (before the flowers open). Even the unopened buds have stickers which can be brushed off the buds while they are still attached to the cacti, or removed after picking by rolling the gathered buds around on a mesh screen (6). Another method is to fill two saucepans one-third full each with clean gravel, then add cholla buds and poor the mixture from one pan to the other four or five times, then remove buds which only have a few remaining thorns, and pull off the rest of the thorns with tweezers (2). Continue with this process of gravel pouring and tweezing until all the thorns have been removed, then wash the buds.

Food Uses for Cholla: Harvested buds can be cooked in a pit of coals or boiled in water until they are tender. Pit baking was practiced by laying buds in alternating layers with hot stones, the whole sandwiched between layers of salt bush and hot coals (2). After baking overnight, the buds were dried out and stored. Precooking reduced spoilage during storage. Boiling is an easier technique for modern preparation. After cooling, the buds can be eaten, or dried in the sun and stored for later use. Rehydrate dried buds by soaking in water for several hours, then boil them. The reconstituted buds can be used in salads or stews. Recipes include cholla buds and squash, and fried cholla and corn mush (2). Calcium is found in high concentrations in the buds—which are also low in calories—and they are a source of iron. Cholla fruits ripen in late summer. The fruit of the jumping cholla *(Opuntia fulgida)* tastes tart-sweet. These can be knocked off the plant using a stick or picked with tongs. Some traditional ways the Seri Indians removed the glochids (the tiny bunches of irritatingly small sharp spines) included sweeping or scrubbing the fruit with creosote branches; wiping with a wet cloth; or rolling in the sand, then soaking in water to remove remaining tiny spines (7). After the spines were removed, the skin was pealed off the fruit and the fruit was cut down to reveal the fleshy green insides, which contain seeds. This was eaten fresh, sometimes with salt added. The fruit could also be cooked in water, then mashed. Honey could be added for variety. The fruit could also be roasted for half an hour on hot coals.

Other uses for Cholla: The intensely spiny Teddy bear cholla *(Opuntia bigelovii)* was used to deter animals by covering buried storage jars with joints of the cactus and using the cactus in fencing around cultivated fields,

YUCCA

***Yucca baccata* (wide leaf, datil or banana yucca)**
***Yucca elata* (narrow leaf, palmilla)**

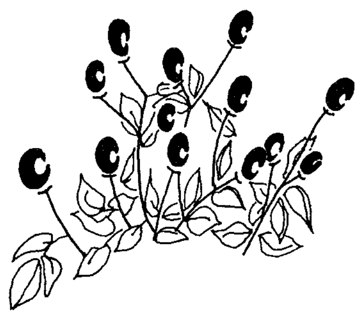
Yuccas grow in mesas and foothills. The two types listed above are quite different in their appearance and the use to which native people put them. They can be distinguished from one another by the positions of the leaf crowns. *Yucca baccata's* leaf crown sits on the ground and the flowers and fruit appear on a relatively short stalk. In contrast, *Yucca elata's* leaf crown sits atop a tall, shaggy stalk, and the flowers appear on yet a higher stalk emanating from the leaf crown. *Yucca elata* is harvested for its tasty flowers (but NOT for its fruit), and for its very useful fibers. Yucca elata appears in deserts and grasslands, with its white flowers emerging in the spring. *Yucca baccata*, or banana yucca, is harvested primarily for its tasty fruit which resembles fat bananas with a reddish twinge when ripe. Fruits can be harvested in early to late summer depending on the elevation.

Food Uses for Yucca: If *Yucca baccata* fruit is picked ripe (when it's a reddish color) it can be eaten raw. The fruit can also be picked green and ripened in the sun. The fruit is cooked by boiling, baking or pit roasting. The skin of roasted fruits blackens and is easily peeled off. Early Indian groups would discard the skin and seeds of the cooked fruit and mash the remaining pulp into paste, spreading it on mats to dry (which could take several weeks). The thin layer could then be worked into blocks or cakes and stored. Whole fruits could also be split, the seeds removed and the fruit sun-dried, to be eaten dry at a later time or boiled up with water. The sweet *Yucca baccata* fruit can be made into jam, fillings for turnovers or pastries, fruit leather, pie and syrup (2). While the fruit of *Yucca elata* is not eaten, its buds and young flowers can be gathered, boiled and seasoned, cooked in soups, or used in salad. In the past, the flowers were dried, ground, and roasted, and used as a thickener for soups (2). Recipes for *Yucca elata* flowers include salad, soup, hash and even an omelet using *Yucca elata* petals (2)(3).

Other uses for Yucca: Plant materials from *Yucca elata* were used to make sandals, cords, baskets, nets and rough cloth (8). Whole or split leaves could be plaited to make sandals. Fibers were obtained from the leaves by soaking green leaves in water, then pounding them with a mallet on a flat rock (8). After pounding they were washed periodically to rinse away less enduring parts of the plant flesh, then pounded again. Eventually strong fibers were revealed which were used to make thread or cord. Yucca roots were used, after cleaning and pounding, for washing hair or clothes. Boiling the roots would also yield a solution used as a soap (8). This soapy quality is present in both species.

WILD CHILE

***Capsicum annuum*, var. *aviculare* (chiltepin)**



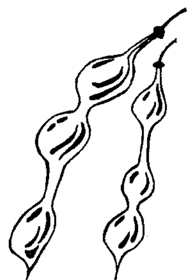
The wild chile, known as chiltepin, is a perennial shrub that can be found growing in desert mountain canyons. Indigenous peoples made gathering trips to areas where it was known to grow, and used the wild chile for seasoning. Since not all groups had access to such areas, it was a trade item as well (2). In nature the chiles grow under nurse plants like trees and thorny shrubs which afford protection from temperature extremes.

Food uses for Wild Chiles: Historically, wild chiles were dried and stored for future use. The same can apply today, the difference being you can obtain seeds and cultivate them in your garden instead of harvesting wild populations. Seeds are available from Native Seed/Search (2509 N. Campbell Avenue, #325, Tucson, AZ 85719; send $1 for seed catalog). The berries can be used in either their green or red stage and are harvested in the fall. These chiles are HOT! Be careful when you handle hot chiles; DO NOT TOUCH your eyes or other sensitive areas until after you have washed your hands carefully with soap and water. These chiles contain vitamins A, C and B2.

Other uses for Wild Chiles: The wild native chiles were used in the past to preserve meat, treat acid indigestion and help wean breast-feeding babies (4).

PALO VERDE

***Cercidium microphyllum* (foothills palo verde)**
***Cercidium floridum* (blue palo verde)**



Palo verdes are abundant trees in the desert southwest. Like mesquite, pods contain seeds that ripen in late spring/early summer. In this case, the seeds are larger, and, when they are young, the seeds are soft enough to eat fresh. Two species can be harvested. *Cercidium microphyllum*, or foothills palo verde, and *C. floridum*, or blue palo verde. Foothills palo verde seeds are preferable for eating fresh. Both grow naturally along washes, as well as being planted throughout the southwest in modern times.

Food Uses for Palo Verde: The fruits from these two species are about three inches long and are tender when they are young. At this early stage they can be steamed like a green vegetable [illegible] furnishing vitamin A. While still tender, the seeds can be shelled and cooked like green peas or used raw in salads. Mature seeds can be parched and ground into flour. Historically the seeds were separated from the pods by rubbing handfuls of dried pods together inside a cloth (5). DO NOT EAT the seeds of the Mexican palo verde tree; these seeds are about [illegible] inches long and are toxic (3). Be sure you know exactly which species of palo verde you are harvesting from.

Other Uses for Palo Verde: Traditionally, palo verde seeds were sometimes strung into necklaces (7).

Other Drylands Plants Used for Food

Wild Plants

organ pipe cactus	*Lemairecereus thurberi*
hedgehog cactus	*Echinocereus* spp.
tansy mustard	*Descurainia pinnata*
wild mint	*Mentha arvensis*
wild onion	*Allium cernuum*
wild grape	*Vitus arizonica, californica*
wolfberry	*Lycium pallidum, L. femontii, L. exsertum*
desert ironwood	*Olneya tesota*
plantago	*Plantago* spp.
amaranth	*Amaranthus palmeri*
chenopodium	*Chenopodium* spp.
purslane	*Portulaca* spp.
saltbush	*Atriplex wrightii*
Johnson grass	*Sorghum halapense*
pinyon pine	*Pinus edulis, P. monophylla, P. cembroides*
black walnut	*Juglans microcarpa*, var. *major*
acorns	*Quercus emoryii*
chokecherry	*Prunus serotina*, var. *virens*
wild current	*Ribes inebrians, R. cereum*
elderberry	*Sambucus* spp.
tomatillo	*Physalis pubescens, P. Fendleri*
manzanita	*Arctostaphylos pringlei, A. pungens, A. patula*
wild rose	*Rosa arizonica, R. stellata, R. neomexicana*
lemonadeberry	*Rhus trilobata*
cattail	*Typha latifdia, T. angustifolia*

Cultivated Crops

corn	*Zea mays*
lima beans	*Phaseolus lunatus*
squash	*Cucurbita* spp.
sunflower	*Helianthus annuus*
tepary beans	*Phaseolus acutifolius*

Sources: 2, 4, 5, 6

REFERENCES

1. Castetter, Edward F. and Willis H. Bell, 1942. *Pima and Papago Indian Agriculture.* University of New Mexico Press, Albuquerque NM.
2. Neithammer, Carolyn, 1974, *American Indian Food and Lore; 150 Authentic Recipes.* Collier Books, New York.
3. English, Sandal, 1981. *Fruits of the Desert.* Published by the Arizona Daily Star, Tucson, Arizona.
4. Dahl, Kevin, 1995. *Wild Foods of the Sonoran Desert.* Arizona-Sonora Desert Museum, Tucson, AZ.
5. Eberling, Walter, 1986. *Handbook of Indian Foods and Fibers of Arid America.* University of California Press, Berkeley, Los Angeles and London.
6. *When Everything Was Real; An Introduction to Papago Desert Foods.* Prepared by students of the Indian Oasis School District #40, P.O. Box 248, Sells, Arizona 85634.
7. Richard S. Felger and Mary B. Moser, 1985. *People of the Desert and Sea, Ethnobotany of the Seri Indians.* University of Arizona Press, Tucson, AZ.
8. Balls, Edward K., 1970. *Early Uses of California Plants.* University of California Press, Berkeley and Los Angeles.