

Corn (*Zea mays*) - Poaceae family

O'odham: *Huñ*

Yoeme: *Vachi*

Spanish: *Maíz*

In Mission Garden

Corn is synonymous with summer at Mission Garden. During the sweltering days of late June and early July, we rejoice to join the O'odham in the celebration of a new year, when the saguaro fruit is harvested, the clouds are bringing rain, and it's time to

plant corn. If we are fortunate we can stand with O'odham farmers, facing the rising sun, and listen to ancient corn songs and blessings, help offer the earth a gift of tobacco, and plant some sacred seeds, four in each hole, in the newly moist, appreciative soil.



O'ODHAM 60-DAY CORN TASSELING IN THE FIELD IN EARLY SEPTEMBER



MELISSA KRUSE-PEEBLES, FORMERLY OF NATIVE SEEDS/SEARCH, WITH EAR OF CHAPALOTE CORN IN THE EARLY AGRICULTURE GARDEN, DURING AN EDUCATIONAL WORKSHOP IN 2014

By early fall, you will see corn standing tall, bright and sprightly in the fields, waving in the wind. In the Early Agriculture and Hohokam gardens the close groupings of the ancient Chapalote corn tower above (even tall) gardeners, reaching heights of up to 10 or 12 feet.



The O'odham 60-day corn in the O'odham gardens, however, develops and produces in such a short span of time that it remains comparatively short. Other varieties may include the Guarijío Red Sweet Corn growing in the Spanish vegetable patch, or drought-tolerant Hopi Blue Corn, planted experimentally in the larger fields.



60-DAY CORN HARVEST AT MISSION GARDEN IN 2015

Remnants of corn, also called maize, were discovered during archaeological excavations at and in the vicinity of Mission Garden at the turn of this century. Carbon dating confirmed that some of the samples were more than 4,000 years old. These findings were among the keys to understanding that this place is one of the longest continually cultivated agricultural sites in the United States. According to archaeologist Jonathan Mabry, "The precise timing of the introduction of cultigens from Mexico is not known, although direct radiocarbon dates on maize indicate it was being cultivated in the Tucson Basin by 2100 B.C."

In Your Garden

Corn has long been a mainstay of Sonoran Desert farmers. If you wish to grow corn in your own garden, prepare to plant groups of corn approximately four feet wide, with about a foot between each plant. Traditionally, corn is planted in time for the monsoon rains in late June or early July, although an additional crop can be planted as soon as there is no danger of frost, as early as March or April. Since corn is wind pollinated, proper development of the kernels requires that the pollen from the



INTERN ANDRE RIOUX HAND-POLLINATING CHAPALOTE CORN TO AVOID CROSS POLLINATION WITH O'ODHAM 60-DAY CORN.



(male) tassels fall on the silks at the tips of the (female) ears. If you only want to grow a few plants, you will need to pollinate them by hand. (Knock pollen from tassels into a bowl and use a soft brush to “paint” the silks.) Irrigate your corn plants well when they are tasseling, and make sure the soil is fertile, since water requirements and nutrient uptake are highest during pollination. If you intend on saving seed and preventing cross pollination with other varieties, just plant one variety each season. The best seed from each cob should be carefully selected, discarding the smallest and rotten ones.

Harvest



MAYLENE, A MISSION GARDEN VOLUNTEER,
HOLDING SOME EARS OF CHAPALOTE CORN

The ears, generally one, sometimes two, and occasionally even three, grow from the middle of the stalk, at the nodes. Depending on the variety, they have between 8 to 16 rows of grain. Their nutritional content (carbohydrates, amino acids, minerals and vitamins), time to maturity, and ecological requirements also vary greatly depending on variety.

There are four basic types of corn: flint, flour, popcorn and dent corn. O’odham 60-day corn is a flour and flint corn. As its name denotes, it matures in 60 days. It can be planted as late as mid-August, if the monsoon rains are delayed (or if you are late to prep your garden beds), and still reach maturity, to be harvested as green corn, before any danger of frost or cold temperatures in mid-October. In the O’odham calendar, the word for the period that corresponds with the month of August is

şopol eşabig, which means “the time of short planting season”. This quick maturation time also means that it needs less water overall. If planted in spring, this variety will take longer to reach maturity but the ears will be larger. For green corn, test ideal ripeness by pulling back the husks enough to poke the kernels with your fingernail. If the kernels exude a milky liquid they are ready. Early on in the season fresh green corn can be eaten right off the stalk, without any cooking at all! It can also be boiled at this stage, and eaten on the cob, or the



kernels cut off and added to an array of dishes, such as green corn tamales, which are wrapped in the corn husks that are selected and stored for that purpose during the harvest season. Corn that has ripened a bit more is typically roasted on an open fire with the husks on, until the husks burn off and the corn is browned. After it is roasted it is dried in the sun on the cob, and then stored (strung up or put inside rodent-proof containers). Traditional earthen seed storage jars were sealed with lac from plants, such as that from the *Coursetia glandulosa* plant, and put underground to ensure a constant and cool temperature. A traditional dish the O'odham prepared with the roasted, dried and ground corn is called *ga'iwsa*, a sort of stew. When saving seed, or using this corn for flour, leave the ears on the plants until they are dry. Dried 60-Day corn can be ground into cornmeal, and used, for example, to make *atole*, a thickish beverage.

Chapalote is among the oldest landrace varieties of corn that have been preserved. Unlike 60-day corn, which is evenly light yellow and opaque, Chapalote is a somewhat translucent popcorn of myriad hues ranging from auburn to blackish brown. It takes at least 75 days to reach maturity, and many more days to dry on the plant, as it should do when used for popcorn, or for *pinole* (porridge made with finely ground corn). It can also be used to make *pinole flor* by first popping and then grinding the kernels, to obtain a light and fluffy meal that is excellent as a breakfast cereal.

Guarijfo Red is a sweet corn that takes on a dark garnet hue when it is allowed to dry on the plant. For eating fresh it's best to harvest when still soft, in the milky stage. Since the kernels take on more color as they ripen, it is most tender when it is still light in color. As it dries on the plant, the kernels redden and wrinkle. This is the right time to harvest when saving seed. (All kernels of sweet corn varieties are wrinkly when dry).



JESÚS GARCÍA PREPARING TO ROAST SOME GREEN CORN TO DRY AND GRIND TO MAKE GA'IWSA OR CHICOS



Corn is a high-calorie food containing protein, fats and carbohydrates, as well as calcium, phosphorus, vitamin A, thiamine, riboflavin and niacin. Nixtamalization is a process that makes the nutrients in corn more available to the body, essentially rendering it more nutritious. It consists in boiling dried corn kernels with slaked lime (calcium hydroxide), then soaking them to enable loosening and removing the outer seed coats, which is traditionally done by washing and squeezing, or kneading the corn kernels and decanting off the skins.

Nixtamalization lends a distinctive taste and texture to the resulting hominy often added to *pozole* soups, and the dough that is made with it. Doughs are made by grinding hominy on old-fashioned grinding stones or more modern hand-mills, and typically used for tortillas, or holiday winter tamales. Historians believe that the process of nixtamalization was crucial to the development of ancient Mesoamerican cultures, enabling them to thrive. It is not clear to this writer whether the O'odham and their ancestors ever practiced nixtamalization, but German missionary Ignaz Pfefferkorn did note that the "Pima" he observed during his time at Misión Atil, in what is now northern Sonora, Mexico, sometimes boiled the kernels to remove the skins. (It's likely he was unaware of them adding lime or ashes to the water to help loosen the pericarps.)

Life in traditional homesteads in this region used to revolve around the seasons of planting, tending and harvesting corn and other crops. People lived near fields where they could grow corn, like here at S-cuk Şon (the O'odham name of a village that eventually became Tucson). Daily routines involved processing, storing and cooking corn, and there were always spaces devoted to storage. Corn was often kept year round in large raised cribs like oversized baskets on stilts. They were made out of saguaro ribs or river cane, and called *trojes* in Spanish. Another typical use of corn was a fermented beverage called *tesgüino*. As the following quote from the Arizona Weekly Citizen from May 19, 1894, "teswin" was a popular drink in Tucson.



STUDENTS EXPERIENCE GRINDING CORN WITH STONE TOOLS, CALLED *MACHUD* IN O'ODHAM AND *MANO Y METATE* IN SPANISH.

All honor was shown today to San Ysidro Labrador...San Ysidro is the rural saint, the patron of the fields and crops. The image was carried today about the fields below town, with a



gay procession following...At every house refreshments are on hand, and are served. A feature is usually an olla of teswin, a light wine made of corn. No other intoxicants are permitted.



STUDENTS PLAY WITH WINDMILLS MADE OF CORN STALKS

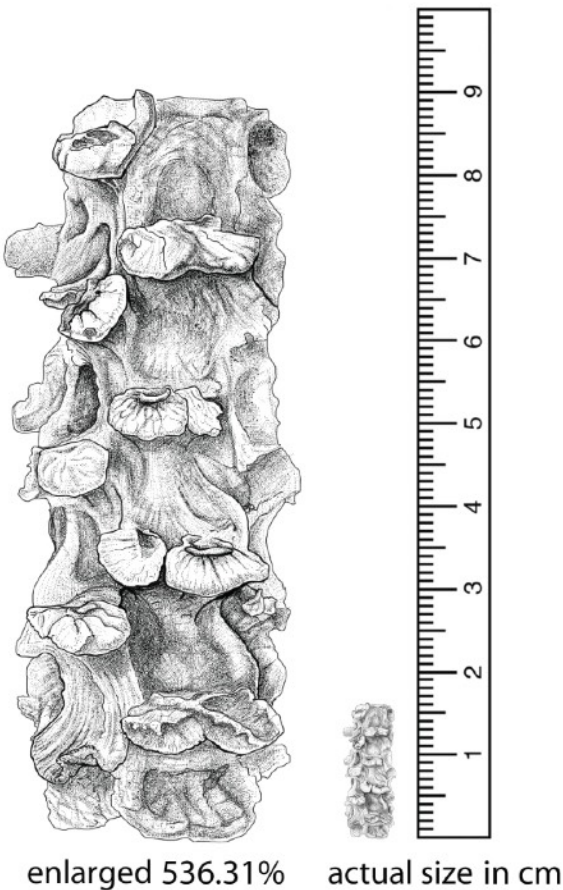
Corn leaves and stalks are fed to animals as fodder, and the cobs are used as kindling for fires. Cobs and husks were favorite materials for making dolls. Corn is even used as medicine. To this day, many people of indigenous and Mexican origin save corn silk to make teas as remedies for kidney and bladder ailments. Corn has been such an essential part of life that it is much more than an agricultural crop. It has a spiritual dimension, and is venerated in prayer, poetry and song.

Origins

Corn was domesticated in Mesoamerica beginning more than 10,000 years ago. Its wild ancestor is teosinte, a large grass with sugary stems. This sweetness may have been what first drew people to it—archaeologists have found ancient quids of chewed teosinte stalks. The domestication and cultivation of corn gave rise to the first sedentary agricultural societies in Mexico around 6,000 years ago. Corn eventually migrated south to Guatemala, Peru and Argentina, and all the way north to Canada, developing extraordinary genetic elasticity. The four most ancient varieties are all popcorn types: Palomero Toloqueño, Arrocillo Amarillo, Nal-Tel and Chapalote. One of the oldest cobs of corn discovered in the southwestern United States is a 4,000 year-old ear of corn related to Chapalote, discovered in a bat cave in New Mexico.

Thousands of years ago, corn cobs were small, less than two centimeters long. Some 3,500 years ago, indigenous peoples here used stones to grind corn, and flat earthenware griddles to cook tortillas. They used stone hoes and wooden planting sticks hardened by fire. Throughout Mesoamerica and Aridamerica corn was the most important cultivated crop. In 1492, corn had reached its peak diversity, grown from the Equator to the 5th parallel and





EARLY CORN COB. ILLUSTRATION BY ROBERT B. CIACCIO

from sea level to about 10,000 feet. Spanish colonization of America introduced corn to the rest of the world. The Spanish and Portuguese took it to Europe, Africa, and the Philippines, and from there it was taken to China, Indochina, and India. Today, it is cultivated throughout the world. Readily cross-pollinating, and adapting to different climates and conditions, it has given rise to immense diversity. Corn is the world's most important food source. In Mexico alone, it provides half of the food for the population.

Throughout the fertile floodplains of the Sonoran Desert, including the Santa Cruz River Valley, corn has been grown for at least 4,000 years. In an excerpt from a letter by Don Diego Carrasco, who accompanied missionary Eusebio Francisco Kino on a trip up the Santa Cruz in 1698, "*...That day in the afternoon we departed for San Agustín de Oyaú. We passed through San Cosme del Tucón, through another large ranchería, through many cornfields, abundant fields of corn and*

beans, and watermelon and squash that grow in these environs."

Missionaries and other colonists soon began growing corn in the fields surrounding the missions and presidios. It was considered less valuable than wheat and barley, but it could be grown in the summer, whereas the "Old World" grains were grown in the winter.

Corn was fundamental to the colonization of the land that is now the United States. It was a primary food source of many of the indigenous people, and it provided an essential food source for new immigrants. It eventually became an inexpensive way to feed black and indigenous slaves, as well as livestock, while white colonists favored wheat and meat. To sustain a growing white population extensive tracts of land that had been the territories of



native peoples were destined to the cultivation of corn as animal feed, giving rise to the Corn Belt.

And yet, as Roberto Cintli Rodríguez points out in *Our Sacred Maíz Is Our Mother*, corn continues to be an integral part of the cultural identity of people from maize-based cultures despite colonization, migrations, shifts from rural to urban lifestyles, and even the displacement of landrace varieties by genetically modified organisms.



CORN SMUT, OR *HUITLACOCHÉ*, DEVELOPS IN CONDITIONS OF HIGH HUMIDITY. FOR INDUSTRIAL FARMS IT CAN BE DEVASTATING, BUT BY MANY FARMERS WITH SMALL PLOTS, OR *MILPAS*, IT IS CONSIDERED A DELICACY.

Corn is extremely adaptable to different ecological and climate conditions. In Mexico alone there are 59 native landraces especially suited to specific local conditions and selected for unique traits and culinary traditions. Since corn cross-pollinates so readily and at such long distances, this biodiversity—so essential for food security—is in danger of disappearing with the encroachment of homogeneous genetically modified hybrids, which require abundant inputs (fertilizer, pesticides, water, fuel). Moreover, second generations of these modern hybrids degenerate, and in any case patent-protected seeds must be purchased every year. Farmers who switch to patented genetically modified seeds can no longer rely on their own



locally adapted seed, and that of their neighbors, as has been the custom worldwide for thousands of years.

Corn was originally domesticated and adapted to small farms worked by hand with simple wooden and stone tools. Nowadays, in the United States, the government subsidizes farmers to grow corn on a massive scale that is highly productive, but requires large inputs of synthetic fertilizers, toxic pesticides and herbicides, and extra water and fuel. Yellow dent corn dominates the industry throughout the US. This commodity corn is poor in nutrition and insipid to taste, so it is predominantly used to produce sweeteners for processed foods, and to fatten livestock (products that are leading to widespread disease). Although most small farms are being driven out of business, many farmers and gardeners with small holdings—or holdouts—have labored to preserve their beloved landrace varieties, which still afford a diverse array of delicious flavors, textures, shapes and colors.

Acknowledgement

The O’odham 60-day, Chapalote and Guarijío Red Sweet seed was all donated to Mission Garden by Native Seeds/SEARCH back in 2013, when Mission Garden planted its first vegetable gardens. Since then we have grown out our own seed, and partnered with Native Seeds/SEARCH to grow new seed lots.



O’ODHAM 60-DAY CORN SEEDS PHOTO: KENDALL KROESEN

All of these varieties are indigenous to this region. The 60-day corn is indigenous to the Sonoran Desert, domesticated and adapted to this land by the O’odham and their ancestors. We are indebted to them for sharing with us the sacred gift of these unique seeds that contain and embody invaluable centuries of cultural knowledge and care. We appreciate that this corn is more than just food, it is song and prayer and ceremony. It is family. And it is life. Therefore, we sow these seeds, tend to these plants, and enjoy the fruits with immense gratitude and respect.





CORN LEAVES, SKY AND SUN. PHOTO: EMILY ROCKEY

Fun fact. The word maize derives from the name for corn in Taíno, the language of the Antilles, where Columbus' voyagers first came into contact with the plant.

Further reading: *From I'itai's Garden. Tohono O'odham Food Traditions.* Tohono O'odham Community Action, 2011; *El Maíz, Fundamento de Cultura Popular Mexicana*, Museo Nacional de Culturas Populares, 1982; *Archaeological Investigations in 2007 and 2008 at the Mission and Mission Garden Loci of the Clearwater Site, AZ BB:13:6 (ASM), and the Santa Cruz River Westside Canals, AZ BB:13:481 (ASM), Tucson, Pima County, Arizona*, edited by M. L. Brack Michael W. Diehl J. Homer Thiel, 2018; "Early Maize in the Greater Southwest", *Archaeology Southwest*, Volume 13, Number 1, Winter 1999; *The Omnivore's Dilemma*, Michael Pollan, 2006; *Our Sacred Maiz Is Our Mother. Indigeneity and Belonging in the Americas*, Roberto Cintli Rodríguez, 2014; *Beautiful Corn, America's Original Grain from Seed to Plate*, Anthony Boutard, 2012; *Seed Saving in the Southwest. Techniques for the preservation of seeds in the drylands*, Joy Hought and Melissa Kruse-Peebles. Native Seeds/SEARCH, 2016.

