


Tohono Chul Park  **Ethnobotany: Harvesting the Desert**  
**Information for Teachers and Suggested Activities**

The purpose of the attached material is to introduce you and your students to Tohono Chul Park's Outreach program — *Ethnobotany: Harvesting the Desert*. The materials are offered as preparation for our presentation, and as ideas for additional activities in your classroom. These are suggestions only, but we hope that you will incorporate them into a unit on Native Peoples, Arizona history, or Sonoran Desert plants. If you have any questions, please give us a call at 742-6455 x 241.

### **Outreach Programs and the Arizona Standards**

Depending on the grade level of your class, this docent-conducted Outreach program will cover some or all of the following Arizona Standards:

#### **Arizona Science Standards**

##### **Standard 1: Science as Inquiry**

- o 1SC-R2. Ask questions about the natural world
- o 1SC-R6. Communicate observations and comparisons through various means

##### **Standard 3: Personal and Social Perspectives in Science and Technology**

- o 3SC-F3. Describe and explain the interrelationship of populations, resources and environments
- o 3SC-P4. Identify and describe the basic processes of the natural ecosystems and how these processes affect, and are affected by, humans

#### **Arizona Social Studies Standards**

##### **Standard 1: History**

- o 1SS-F2. Describe everyday life in the past and recognize that some aspects change and others stay the same
- o 1SS-F3. Use stories to describe past events, people, and places
- o 1SS-E2. Describe the legacy and cultures of prehistoric American Indians in Arizona, including the impact of, and adaptations to geography
- o 1SS-E3. Describe Spanish and Mexican colonization and economic, social, and political interactions with the first inhabitants of Arizona

##### **Standard 3: Geography**

- o 3SS-F2. Identify natural and human characteristics of places and how people interact with and modify their environment
- o 3SS-E2. Describe the impact of interactions between people and the natural environment on the development of places and regions in Arizona, including how people have adapted to and modified the environment
- o 3SS-E7. Explain the effects of interactions between human and natural systems, including the changes in the meaning, use, and distribution of natural resources, with emphasis on ways that humans depend upon limited resources and adapt to, and affect, the natural environment, changing ideas and disagreements on the best use of natural resources



## ETHNOBOTANY



**Ethnobotany** is the study of the relationship between human society (*ethno*) and plants (*botany*). This includes the investigation of how native peoples used plants, both wild and cultivated, for food, medicine, clothing, dyes, shelter, tools, etc. Since earliest times human populations have had an intimate knowledge of the plants in their environment. This was an absolute necessity for survival. As cultures developed, plants were incorporated into lore and religion. Information on use and avoidance was passed down through the generations; the Indians' relationship to the plant world is the product of centuries of accumulated knowledge. The longer a group lived in an area, the more they would come to know about the native plants and the more they could utilize them in their lives. The Hopis, for instance, use almost every wild plant growing on the mesas. The Navajos, on the other hand, use some wild plants, but not all. This difference helps to verify that the Hopi have occupied their environmental *niche* for many centuries longer than the Navajos have theirs.

Hunting and gathering societies relied solely on wild plants gathered from around campsites and along migration trails. Agricultural societies domesticated and then cultivated specific plants to meet their food and utensil needs, while continuing to gather those wild plants readily available. Arid lands produce gatherers. Desert plants produced great quantities of seeds to insure propagation in an area with uncertain growing conditions. The abundance of seeds provided an easily gathered harvest for native peoples. The seeds could be ground and made into breads or cereals. The collection must be done quickly and on a large scale to harvest the greatest amount possible. Such activities required the organization of groups and from these groups villages formed and agricultural societies became possible.

Early farming methods included dry land farming, reliance on natural rainfall for irrigation; terrace farming, plots built up from surrounding land to catch and hold available rainfall; and irrigation farming through the building of canals and the diversion of stream and river flows. The Tohono O'odham did not live near a major river that could provide the necessary water for irrigation farming. Their agriculture was therefore much less extensive. Winters were spent in the foothills where there were permanent water supplies. Summer camps were established in the valleys where fields were carved out along floodplains. Their diet consisted of dried foods, cereals, vegetables and sun-dried meat. Fresh food was only available for short periods and was then consumed in quantity. The year-round staple was a flour made from corn or wild seeds and beans. Whole seeds were parched, sun-dried and stored, ground as needed.





## FOOD MIGRATIONS

If we are what we eat, then the “age of discovery,” heralded by the arrival of Europeans on the North American continent, involved more than just new territories and new peoples; food changed hands as well and things were never the same. Before 1492 people of the Americas had no wheat, apples or sugarcane. Europeans had never tasted corn, tomatoes, potatoes, chile peppers, chocolate, or coffee. What we know as “traditional” Spanish or Italian cuisine, would not have existed without the introduction of corn, chilis and tomatoes. Meat had never been a staple in the diet of the indigenous peoples of the Southwest. Occasionally wild game, such as rabbits, javelina or deer was added to the menu; but the staple foods were corn and beans. Cows, pigs, chickens and sheep would mean meat on the table, milk and cheese, a steady supply of eggs and a new fabric, wool.

Though initially mistrusted as poisonous, and later believed to be an aphrodisiac, crops such as potatoes (and corn) meant greater yields per acre and allowed for increased populations in Europe. Safely stored in the ground, potatoes could overwinter in northern climates and, survive the ravages of war. Corn, introduced throughout the Mediterranean and Africa, grew quickly and thrived in harsh, dry climates. In Europe, corn never really caught on with people, being used more for animal fodder.

Europeans also profited by adopting Native American methods of food preparation and preservation — pickling, spicing, and marinating with vinegars, oils and herbs. Foods were sweetened with maple and corn syrups. Nuts were pounded to create butters and oil extracts, used in place of dairy products for shortenings.

### ACTIVITY – Old World/New World: The Columbian Exchange

Using a map of the world, locate and chart the routes of early explorers of the New World. Have students research the exchange of ideas, foods, medicines, diseases and people during the age of exploration. Posters and charts can be created illustrating these exchanges. Students can write reports on some of the effects of the contact between such different cultures. How did ideas about food, government and slavery change the world? How would the world be different if Columbus had never “discovered” America? What would have happened if Native Americans had sailed to England or Spain instead?





## TOHONO O'ODHAM ETHNOBOTANY

### Plants as Food – Cultivation

#### Tepary Beans

Nicknamed the *Babavi (papavi) O'odham* (Tepary Bean People) by the Pima, the term later became *Papago*, a pronunciation corrupted by Europeans unused to native languages. Why the nickname? The Tohono O'odham (Desert People) as they call themselves today, grew a great many beans – tepary beans. Highly nutritious (containing more protein than other beans), the tepary is uniquely adapted to rigors of the Sonoran Desert. In the mythology of the Tohono O'odham, the tepary is the child of the Desert People, the white bean said to be the Milky Way scattered across the sky. As early as 1716 it was reported that the principal crop of the Tohono people was beans, not the corn usually associated with native peoples.



For the Tohono O'odham, farmwork (*oidag cikpan*) demands an intimate knowledge of the desert and its resources. Traditional irrigation farming is *Ak chin (ak ciñ* or arroyo mouth), or dry land farming – stormwaters naturally flooding a cultivated alluvial fan. Brush weirs (*sai'ijida koli*) would be constructed to form permeable filters that would dissipate the destructive energy of the floodwaters. The weirs allow water and humus to be deposited downstream, adding nutrients and organic matter to the soil while controlling the erosive force of the water. Water could also be diverted by means of a ditch, to flood fields adjacent to a wash or arroyo; or collected in *charco* (dirt tank) reservoir for later use.

Teparies are usually planted with the July rains. The beans are planted after the second drenching summer rain; the first storm only begins to cool the soil after the heat of summer and moisten the parched earth. Teparies are planted in rows on either side of corn, sorghum or red or pinto beans. Squash, watermelons and devil's claw are also planted. Teparies may be red, tan, beige or brown, as well as white. At harvest time, plants are pulled by the roots and left to dry with their roots pointing to the sky. A week later, the plants are beaten with a flail made of saguaro rib or mesquite wood. Shovels are used to toss the broken pods into the air to allow the breeze to blow away the larger chaff. Finer winnowing is done with sifting baskets made of bear grass and yucca. The beans are dried in the sun for several more days and then stored in cans or sacks. Planting seed for next year is selected at this time and kept in a safe place. When cooked, dried teparies have a mild, but distinctive taste; the white milder than the brown.



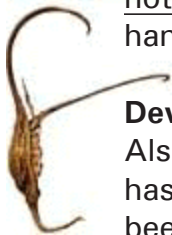
### Murphey Agave

Murphey agave, native to parts of Arizona and Sonora, appears to have been widely cultivated by the Hohokam. Low earthen berms were terraced across mountain *bajadas* to catch sheet runoff from storms. The agaves were planted on the upslope sides of the berms where they could take advantage of the additional moisture. The artichoke-like hearts of mature plants were harvested before the flower stalk emerges (time of highest sugar content), pit-roasted and eaten. The leaves of agaves are processed for their fibers used in making rope. The root, fresh or dried, makes a useful soap and dried root powder in tea relieves arthritis. Agave syrups were also made for sweetening. *[CAUTION: raw sapin in agave hearts is toxic — cook before eating; handling cut leaves can cause contact dermatitis, handle with caution!]*



### Chilies

A member of the nightshade family (tomatoes, potatoes and tobacco), chilies were cultivated by Native Americans and widely used as a spice. Chilies were also used medicinally for everything from the common cold to epilepsy. They vary in size, shape, color, flavor and pungency. High in vitamins A and C, the pods are harvested when almost dry. Do not touch the eyes or other mucous membranes with hands that have handled the peppers; chemicals in the skin and seeds are irritating.



### Devil's Claw

Also called the "unicorn plant", there are two types of devil's claw: one has black seeds and grows wild, the other has white seeds and has been grown since ancient times by the Pima and Tohono O'odham. The white-seeded form is preferred for its longer, finer-grained and deeper black pods. The black epidermal strips are removed and used in basketry. The immature pods can be pickled and eaten like okra, the oil- and protein-rich seeds can be eaten like sunflower seeds. Seeds were also used to polish ollas.

### Maize (Corn)

Maize was domesticated in the Rio Balsas area of Mexico as early as 2,000 BC. Different varieties of corn are grown during the warm weather. Only one variety is grown each planting to prevent hybridization, as the plant is wind pollinated. Most southwestern varieties require two months to mature and were typically planted with the onset of the summer rains. It is a staple food with many ritual uses. Various kernel colors were selected for ceremonial and feast food, while pollen was collected for ceremonial and medicinal uses.



### ACTIVITY – Field Work



How about a school garden? Students can layout, prepare and plant a small ethnobotanical garden on the school grounds. Seeds can be obtained from Native Seed SEARCH (see Resources) and several native crops, such as tepary beans, squash, melons and corn, can be grown and harvested. Lacking an outdoor space, students can try growing chilies, beans or herbs in pots indoors. Plan a trip to Tohono Chul Park and visit our ethnobotanical garden. Here, crops are planted twice yearly and harvested in the fall and spring. The fall harvest is primarily of New World plants, the spring harvest of Old World. Or make a trip out to a working farm around Tucson and see how crops today are planted, irrigated and harvested using modern equipment and technology.

If a garden isn't practical, how about creating a scale model diorama of a Tohono O'odham farm, complete with arroyo and weirs? A plywood base can be covered with sand to form the fields and create the runoff ditches. Sculpey clay can be used to model the people, farm tools and plants.

### Plants as Food – Wild Foods

A variety of wild plants were collected by early hunter/gatherer societies, and continued to be utilized by native peoples during historic times and even today. The Tucson Basin produces over 100 wild plant species that can be used as food. The Tohono O'odham depended upon such plants as wild grains (amaranth, chia, panic grass), cactus fruits (saguaro, prickly pear, barrel cactus), seed pods (mesquite, ironwood, chiltepin), and greens (cholla buds, devil's claw, agaves, mustard). Nuts (acorns, piñons) and berries were also gathered in season.

#### Saguaro

To the Tohono O'odham, the saguaro (*hash'an*) is a person. Some say the first saguaro sprang from a drop of sweat from the brow of I'toi, Elder Brother (creator of wild foods and pottery); others tell of a boy, neglected by his mother, who sank into a tarantula hole and emerged as the cactus. The saguaro sustained the people through the summer until the crops were ready for harvest in the fall. So important was the saguaro to the O'odham people, that the harvest month (June) begins their calendar year.



*growing green and fresh I sit on top  
clouds float by so close  
ripening so red, far they stand  
clouds collect on top  
watering the earth*

-Tohono O'odham song



Each summer, families gather to harvest the ripening saguaro fruit. Harvesting poles (*ku'ipad*) are made of saguaro ribs, two long poles lashed together and two smaller sticks fastened on them as crosspieces. Naturally sweet, each fruit comes with a built-in opener, the sharp edge of the dried calyx. Each harvester takes a bit of pulp from the first fruit and rubs it over his/her heart, asking a blessing for the coming year. The first fruit is then eaten. Once the pulp, seeds and all, is removed, the empty husks are left on the ground, the red interior

facing the sky to hasten the rain. Saguaro fruit pulp can be sun dried whole and eaten like candy or stored. To make saguaro syrup, the pulp is soaked in water for a couple of hours, breaking up the pulp by hand to get all of the juice out. It is then heated for 1 to 2 hours and the remaining pulp and seeds strained out. The resulting juice is cooked down into a thick, sweet syrup; about 20-30 pounds of fruit producing a gallon of syrup. The leftover pulp/seed mixture is spread in the sun to dry. Separated out, the oil-rich seeds are dried and made into cakes or ground into flour. The syrup was used as sweetener or thickened for jam. The dehydrated pulp can be added to syrup to make jam, or dried and stored for later use.

### **Mesquite**

A legume tree, mesquite is one of the most widespread and important resources for Southwestern native peoples. It has been used for food, fuel, building materials, tools, fiber, dyes, and medicines. The yellow flower spikes are very attractive to honey bees. The tree produces an abundance of seed pods during late summer. The first crop of sweet fruits can be collected in July and eaten while green. A second crop may appear with the summer rains and are harvested in October. The preferred pods are those that are streaked red or purple, tending to be the sweeter ones.

The dried pods could be stored whole, or ground, seeds and all, using mortar and pestle (traditionally a bedrock mortar worn into natural rock). The harder seeds are then discarded, as the actual pod is the part eaten. The resulting flour is high in calcium, iron and zinc. It could be stored in the form of small, hard cakes. It is used for cereals, breads



and beverages. Whole pods can also be boiled for *atole*, a healthful drink; fermented, it produces a mildly alcoholic beverage. Providing protein and carbohydrates, mesquite flour would often sustain a family through the long winter, living on gruel, until spring. A woman would spend a full day gathering and grinding enough mesquite to feed one person for five days.



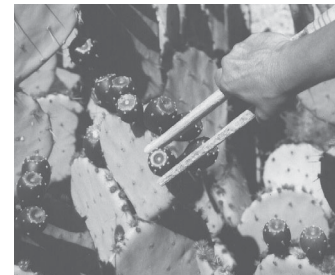
### Cholla



In March, after a long winter without fresh food, the Tohono O'odham looked forward to spring and readily harvested the first available green vegetable, the cholla. Picked before they open into flowers, the buds of the cholla cactus are rich in calcium (one tablespoonful equivalent to eight ounces of milk). Buds are picked with tongs made of saguaro rib (*wa'o*). Today, the buds are rolled on screening to remove the sharp thorns and are boiled until tender; traditionally, they were cleaned in sifter baskets, tossed with gravel, and then pit-baked. Once cooked, the buds can be eaten as a vegetable or added to salads, stews and soups; they can be sun dried and stored, as well.

### Prickly Pear

The young pads of the prickly pear, called *nopales*, can be collected, boiled and peeled. Rather mucilaginous, they can be eaten fresh as a vegetable or pickled and stored. High in calcium and vitamin C, the fruit of the prickly pear is very sweet and juicy. Gathered in the late summer, the fruit is cleaned of its spines and eaten fresh, or cooked and then mashed and strained for the juice which can be made into jelly or mixed with other juices for a delicious drink. Ripe fruits produce a deep pink dye. The flowers can be used to make a gruel. The pads, singed of their spines, are also used as feed for cattle during drought. It is now believed by researchers that the natural pectin contained in prickly pear pads helps in lowering low-density lipoprotein, "bad" cholesterol.





### ACTIVITY – In the Kitchen

For a native foods taste-test, students can research recipes and try making them either at home or in the classroom (see Resources for recipes). Use the sample Recipe Worksheet and have students create their own recipe books! As plants and their products are researched, students can draw pictures of the plant under study, indicate where it is found, what parts of the plant are used and add a recipe or two. Remember, “recipe” doesn’t just refer to instructions for something to eat — it can also be the how-tos for making a basket, or preparing a medicinal tea.

Some desert food products can be bought ready made — prickly pear and chile jellies, corn tortillas, salsas, etc. Some wild food ingredients are available locally (see Resources) or can be collected during a planned field trip. *Remember collections are always made with the permission of the land owner!* There may be native plants on the school property or some children may have prickly pear, saguaro or cholla growing in their yards.

### Plants as Materials

Without a local hardware store, native peoples of the Southwest learned to rely on indigenous plants for the necessities of life. Agave leaves produce long fibers which were braided to make ropes, and woven for nets, sandals and sleeping mats. If you carefully remove the spine at the end of a leaf, keeping the fibers attached, you have an instant “needle and thread.” Yucca fibers were used as well, for basketry, cordage, brushes and woven into a stiff fabric. The hooked spines of a barrel cactus made excellent fishing hooks, and the straight ones can be used as awls and needles.

Creosote roots leach a yellow dye used to color pottery and baskets. Resin from the mesquite tree was used to mend pottery, or thinned with water to make a black paint for decorating pottery. For building materials, mesquite provided larger timbers; saguaro ribs were used for roofing; and ocotillo made a protective, living fence to protect crops. The mucilage from cooked prickly pear pads is still being added to plaster and mortar to increase its adhesion.

#### **Yucca**

Versatile plants that provided both food and materials for early peoples. The reddish, banana-like fruit of *Yucca baccata* can be eaten raw when ripe, or baked; it was also dried and stored. The seeds were ground into



meal. The roots are used in basketry, responsible for the reddish-brown colors in Tohono O'odham basket designs. The flowers and stalks of *Yucca elata* were cooked and eaten; the flowers boiled and the stems peeled and baked like an agave. The fiber of its leaves was made into rope and cloth. Yucca leaves are split and chewed, the tough fibers separating and softening to create a disposable brush used to paint pottery. The roots of both plants contain saponin, a detergent-like substance. They were pounded and soaked in water to release the soap, which was used for washing clothes and hair and ceremonially to bath ritual participants.

### **Cochineal**

Not a plant at all, but rather a parasitic insect that grows on a plant, specifically prickly pear. Cochineal scale insects belong to the order *Homoptera*, with piercing/sucking mouthparts used to suck juices from the host plant. The females of the species are red, hence the name which means "scarlet-colored". The foam-like, cottony substance seen on the prickly pear pads is a waxy secretion of the females, used for shelter from the heat and predators. For thousands of years, natives of the Sonoran Desert have collected these insects, drying and crushing them to obtain beautiful red dyes for textiles, cosmetics and medicines. It takes as many as 70,000 insects to produce one pound of cochineal. Europeans began introducing prickly pear and cochineal to countries from Spain to India, eager to cash in on this new dye source, but the prickly pear and not the cochineal thrived, becoming an unwelcome "weed".

### **Plants as Medicine**

Through trial and error, plants were found which would help in the treatment of illness and injury in the desert. Mescal juice, pressed from the cooked leaves of an agave, would be used to treat vitamin deficiencies (scurvy). Compresses were made from pounded leaf pulp and placed on infections or used to on the chest to relieve congestion. Peeled prickly pear pads were also used to bind wounds, or relieve swelling due to rheumatism.

The mesquite tree and the creosote bush are virtual pharmacies. From the mesquite, the resin was boiled and the diluted liquid was used as an eye wash and to cleanse wounds, also being good for sunburn and chapped lips. Powdered mesquite gum was applied to the navels of newborns to prevent infection. The leaves made a tea for headaches and stomach troubles.

The creosote has antiseptic and antibiotic properties. A tea made from the leaves can be used for upset stomach, colds, kidney problems and arthritis. These leaf teas were mixed with fat and made into salves for burns and sores. The leaves were also chewed and applied to snake, spider or scorpion bites to



relieve the swelling. Today, science has isolated 360 different chemical compounds from the creosote; and has extracted a substance that kills cancer cells in the laboratory.

*Please note that native plants are protected under Arizona law, and may not be collected from public lands without a permit. On private land, you must obtain the permission of the landowner. Caution should always be exercised when using native plants for food or medicinal purposes. We make no claims as to the effectiveness of any plant as a medicine, and all plants used for food should be carefully identified before being gathered, prepared or consumed.*

### ACTIVITY – Natural Dyes

Many desert plants can be used to dye natural materials such as cotton and wool, providing a variety of subtle colors. Dyes are obtained primarily from the flowers, stems and leaves of plants; roots, bark, berries and fruits (prickly pear juice makes a wonderful fuchsia) can also be used. *Remember to always collect with permission and take only what you need!* Often different colors can be obtained from the same plant by using different materials – a root will dye brown, a leaf will dye green and a flower will dye yellow. The season of the year will also make difference. You can experiment with small quantities of a particular plant, using undyed, clean 100% cotton fabric or skeins of clean natural wool, and working without a mordant.

Flowers are gathered fresh and worked with as soon as possible, the same with stems and leaves. Use stainless steel or glass pots and saucepans only. Cover the plant materials with clean water and boil for 30 minutes to several hours until the dye runs strong. Strain the plant materials out and allow the dye to cool before adding your fabric or yarn (wool and dye must be approximately the same temperature as wool does not react well to extreme temperature changes. Wet the wool in warm water before placing it in the pot.) Let sit for several minutes until desired color is reached. Without a mordant, the colors are not fast, but are fine for class art projects.



## THE ETHNOBOTANICAL GARDEN AT TOHONO CHU PARK

The Park's Ethnobotanical Garden was established to display various species of plants, either native or introduced, that have been cultivated by the peoples of the Southwest. The primary emphasis is on plants that were cultivated during the late Spanish Colonial Period in Southern Arizona and in Sonora, Mexico. Many of these plants have been grown for centuries by indigenous Indians, while others were brought from the Old World by Spanish explorers and missionaries. A few are wild plants native to the region which have been brought into cultivation in recent years. It is significant to note that native peoples of the region did not plant crops in the winter, but rather depended upon stored summer harvests and such wild plants as cactus fruit and mesquite beans. It was not until the Spanish introduced wheat, that a regular winter crop was available.



Today, there are several seed-saving organizations around the country, such as Native Seed SEARCH (Southwestern Endangered Aridlands Resource Clearing House) here in Tucson, that are attempting to collect and preserve the seeds of native crops. They seek to utilize the past to preserve the future. Over 100 wild plant species of the Sonoran Desert are listed as threatened, endangered or vulnerable to overexploitation; and, 25% to 30% of the plants of the Sonoran Desert can be found no where else on earth. Loss of habitat is the greatest threat.

Food crops traditionally grown in particular areas of the country are better adapted to surviving changing environmental conditions, are more resistant to pests and of greater nutritional value than most modern crops. As mankind has come to rely more and more on fewer and fewer varieties of plants as food sources (wheat, rice, corn and sorghum supply the majority of the world's calories) the risk of ecological disaster is more likely. Furthermore, native peoples and long-term residents possess a rich and valuable heritage, one worth preserving. The information on fiber, dye, medicinal, ceremonial and food plants may provide answers to the questions of world hunger and disease control.



### ACTIVITY – Create-a-Culture

This is an activity that will allow students to practice everything from cooperation to resource conservation, and from self-government to creativity.

Give students a topographical map, indicating mountains, hills, plains, valleys, bodies of water, and set the parameters for the type of climate, vegetation and animal life available in this “New World”. Divide the class into teams and give each team large sheets of drawing paper. To set the scene, each group has now been set down in a section of this new environment and must determine how they are going to survive - what will they eat, what will they wear, where will they live, what are the rules that will govern their new culture? Have students illustrate the step-by-step process from the tools they will make from the resources at hand, to the crops will they grow and harvest, to the houses they build. The tools must be made before the house is built, or the wild game captured. Will they have a surplus of food to get them through the bad seasons or to trade for those necessities of life that they don’t have?

### WEB RESOURCES:

**[www.mnh.si.edu/archives/garden/welcome.html](http://www.mnh.si.edu/archives/garden/welcome.html)**

Smithsonian Institute’s Seeds of Change Garden; site is no longer maintained, but has resources and activities related to the Columbian Exchange, including ideas for a school garden.

**[www.fairchildgarden.org/EduProfDev/teaching\\_modules.html](http://www.fairchildgarden.org/EduProfDev/teaching_modules.html)**

great “starter” unit for getting students interested in plants

**[www.medplant.nmsu.edu](http://www.medplant.nmsu.edu)**

Medicinal Plants of the Southwest database compiled by New Mexico State University



## RECIPES:

**PRICKLY PEAR****Harvesting/Preparing the Juice**

Use tongs to gently remove ripe fruits (*tunas*) from the cactus pads; a nice gentle twist and pull will do it. Use a bucket or paper sack to carry your fruit. Gloves are always a good idea and carry tweezers too, just in case. Back in the kitchen, place fruit in the sink and cover with water. Grasp fruit one at a time with tongs and using an old toothbrush (never to be used for any other purpose again!), carefully wash each fruit under running water, brushing off as many spines and glochids as possible. Place cleaned tunas in freezer bags and freeze (if you are making jam or jelly, always harvest a few not-quite-ripe fruit as well and add some to each bag). When ready to juice, place frozen fruits in a colander lined with several thicknesses of cheese cloth; cover and let de-frost over night. Once the fruit are soft, use a potato masher to press every last drop of juice out. Pulp, seeds and stickers will stay in the cheesecloth. You can strain the juice once more, using a paper paint strainer, just to be on the safe side. Juice is now ready to use, or can be frozen for later.

**Prickly Pear Jelly** (from Sandal English, Fruits of the Desert)

4 cups prickly pear juice  
 juice of ½ lemon  
 6 cups sugar  
 1 bottle (or 2 packets) liquid pectin

Put prickly pear juice, lemon juice and 3 cups sugar in large pot and bring to a boil. Add remaining sugar and cook, stirring continuously, until mixture again reaches a full boil. Add pectin and continue cooking over high heat for about 15 minutes. Pour into sterilized jelly glasses and seal with melted paraffin. Makes 6 glasses. Note: always make jelly in small batches, as it doesn't always jell in large batches.

**Prickly Pear Sorbet**

¾ cup sugar  
 1 ½ cups prickly pear juice  
 1 cup orange juice  
 ¾ cup pineapple juice  
 1 teaspoon grated lemon rind

simmer prickly pear juice and sugar for about 3 minutes, cool slightly; add rest of ingredients and mix well. Pour into individual cups, ice cube trays, or shallow 9x5x3 pan freeze until firm (serves 6).

**Harvesting/Preparing the Nopalitos**

Prickly pear cactus pads should be harvested in late spring/early summer when they are still small (about the size of your hand), thin and tender. Be sure to wear gloves and use tongs to hold the pad while using a sharp knife to carefully cut it free at the



base. To prepare the pads remove the spines and glochids with a vegetable peeler or a small paring knife. Wash the pads well with cool water and peel or trim off any blemished or discolored areas. Slice the pads in long slices or in pieces or leave whole depending on the dish you will prepare.

### **Nopalito Salad with Prickly Pear Vinaigrette**

2-3 cups fresh cactus pads, sauteed until tender and diced or 1 jar commercially prepared nopalitos, drained, rinsed, and diced

2 cups diced red and green peppers

2 small cans yellow niblet corn, drained and rinsed

1 large jicama, grated or julienned

2 small bags sunflower kernels, pecan pieces, or piñones

vinaigrette:

2 tablespoons red wine vinegar

2 tablespoons prickly pear syrup

6 tablespoons olive oil

¼ cup fresh basil leaves, julienned

1 clove garlic, minced

salt and pepper to taste

whisk ingredients together and season to taste

mix all ingredients together (if serving later, leave nuts out until ready to add the dressing); pour dressing over salad, toss, and serve

## **MESQUITE**

### **Harvesting/Preparing Pods**

Use a paper grocery bag to collect clean seed pods. Pods are ready to harvest when they turn the color of straw; check too by shaking the branch to see if they fall naturally. Beans can be harvested from the ground under the tree, but must be clean and not wet from rain. To destroy bruchid beetle larvae, bake at 150°-200° for 3 hours, or zap in the microwave for a couple of minutes. Treated pods should be stored in tightly covered can. The next step is to turn the pods into a sweet, fine meal. Use only dry, crisp pods (toast in oven if they have absorbed moisture from the atmosphere). Break into small pieces and using a heavy duty food processor or flour mill, grind p cup at a time, sifting out the seeds and fiber. Sift again for finer meal.

Mesquite pods can also be cooked to create a rich broth which can be used in many recipes. Boil 4 cups of broken pods in 8 cups of water for one hour. Cool, then mash and wring all the pods to extract as much of the pulp and flavor as possible. Sieve out fiber and seeds, simmer until reduced to 3 cups. The reduction can now be used to flavor soups and stews, or even baked goods. For mesquite sun tea, fill a glass jar half full of broken pods, fill with water and place in sun for several hours. Chill and serve!

**Sonoran Cookies** (from Pronatura)

- |                           |  |
|---------------------------|--|
| 1 cup butter or margarine | 1 cup mesquite meal                    |
| 1 cup sugar               | 2 cups masa harina (corn tortilla mix) |
| 1 egg                     | 2 teaspoons baking powder              |
| 2 tablespoon vanilla      | 2 teaspoons baking soda                |

Cream softened butter and add sugar, egg and vanilla. Blend well. Sift dry ingredients and add to first mixture. Beat until smooth. Roll into 2 inch balls, flatten on cookie sheet. Bake at 375) for 15-20 minutes or until done, do not overbake.

**Mesquite Baklava** (from Native Seed SEARCH)

- 1 ½ cup butter
- 1 cup milk
- 2 eggs, beaten
- ¼ cup mesquite meal
- 2 cup unbleached all purpose flour
- ¼ teaspoon salt
- 4 teaspoons baking powder
- 1 cup pecans
- ½ teaspoon cinnamon
- 1 cup honey
- 1 cup water
- 2 cups plus 6 tablespoons sugar
- 1 teaspoon lemon juice

Preheat oven to 375°; melt butter, add milk, allow to cool. In large bowl, sift flours, salt, baking powder; add beaten eggs to milk mixture. Next, stir liquids into dry ingredients — batter will be stiff. Combine pecans, cinnamon, and 6 tablespoons of sugar and knead into batter spread batter in 9x13 pan. Bake at 375° for 20 minutes; lower heat to 350° and bake 20 minutes more or until done.

In sauce pan combine honey, water, 2 cups sugar, and lemon juice; boil for 5 minutes, allow to cool. Remove baklava from oven and cut into diamond shapes while hot; pour cooled syrup over hot baklava; cool before serving.

**TEPARY BEANS**

For the dedicated gardener, tepary beans can easily be grown in a summer garden here in Tucson. Seeds are available from Native Seed SEARCH, as are already harvested beans. Any variety of tepary beans can be used in this recipe, but the Tohono O'odham prefer the white. Beans should always be cleaned and soaked over night, rinsed again prior to cooking. Teparies take longer to cook than other dried beans, anywhere from 8 to 12 hours by conventional methods — a slow cooker reduces the time to 6 to 8 hours — so plan ahead. Teparies can be used in just about any bean recipe, added to soups, or cooked with tomatoes and chilies for a Southwestern sidedish.



### Tepary Chili Posole

2 lbs. cooked tepary beans

(wash beans and soak overnight, then place in slow cooker with enough water to cover and a handful of crushed epazote; cook until al dente)

4 medium-large onions finely chopped

3 garlic cloves minced

2 – 7oz cans cooked, diced green chilies, drained  
diced jalapeño to taste

olive oil for cooking

3 lbs. of ground meat of choice

2 – 28oz cans Las Palmas Red Enchilada Sauce – medium

4 – 15 oz. cans white hominy rinsed

4 – 14 oz. cans vegetable broth

Cavender's Greek seasoning

cumin seed crushed

cinnamon

dried chili powder (best available)

dried oregano

shredded Mexican cheese like cotija or asadero for garnish

In bottom of stock pot sauté onions and garlic in olive oil until translucent; add diced chilies and jalapeños and continue to cook until nicely browned. Remove vegetables to side plate and using pot, brown meat until done; while cooking add Greek seasoning, cumin, dried chili powder, cinnamon and oregano to taste. When meat is close to being cooked, add back onions, garlic and chilies. Once meat is cooked, add enchilada sauce and vegetable broth, then hominy and beans; set burner to low heat and leave pot to simmer, stirring often, for about 2-3 hours, or until hominy has swelled and is tender. Serve with shredded cheese garnish; can be prepared ahead and frozen.

## RESOURCES:

### Native Seeds SEARCH

526 North 4<sup>th</sup> Avenue, Tucson, AZ 85705 / 520-622-5561 / [www.nativeseeds.org](http://www.nativeseeds.org)  
mesquite flour, tepary beans, epazote, dried chilies, dried cholla buds, etc.; also seeds for planting; mail order available

### Tohono Chul Park

7366 North Paseo del Norte, Tucson, AZ 85704 / 520-742-6455 / [www.tohonochulpark.org](http://www.tohonochulpark.org)

prickly pear jams, jellies, syrup, and salsa; also chile, jalapeño, and citrus jellies and marmalades; bean soup mixes; blue corn baking mixes; Southwest cookbooks



## SUGGESTED READING:

### History and Usage:

Bliss, Anne	<u>North American Dye Plants</u>
Colton, Mary-Russell Ferrell	<u>Hopi Dyes</u>
Curtin, L.S.M.	<u>By the Prophet of the Earth: Ethnobotany of the Pima</u>
Foster, Nelson and Cordell, Linda S.	<u>Chilies to Chocolate: Food the Americas Gave the World</u>
Grae, Ida	<u>Natural Colors, Dyes from Plants</u>
Wendy Hodgson	<u>Food Plants of the Sonoran Desert</u>
Moore, Michael	<u>Medicinal Plants of the Mountain West</u>
	<u>Medicinal Plants of the Desert and Canyon West</u>
Nabhan, Gary Paul	<u>Gathering the Desert</u>
	<u>Enduring Seeds</u>
Nyhuis, Jane	<u>Desert Harvest-A Guide to Vegetable Gardening in Arid Lands</u>
Spicer, Edward	<u>Ethnic Medicine in the Southwest</u>
Whiting, Alfred	<u>Ethnobotany of the Hopi</u>

### Cookbooks:

Ellen Brown	<u>Southwest Tastes: Great Chefs of the West</u>
Fernando and Marlene Divina	<u>Foods of the Americas: Native Recipes &amp; Traditions</u>
Sandal English	<u>Fruits of the Desert</u>
Barbara Pool Fenzl and Norman Kolpas	<u>Southwest: The Beautiful Cookbook</u>
Lois Ellen Frank	<u>Foods of the Southwest Indian Nations: Traditional and Contemporary Native American Recipes</u>
	<u>American Indian Cooking: Recipes from the SW</u>
Carolyn Neithammer	<u>The Prickly Pear Cookbook</u>
Elisabeth Rozin	<u>Blue Corn and Chocolate</u>



**DESERT RECIPES – WORKSHEETS**

Name of plant:

Description of plant:

Parts of plant used:

Used for:

Name of plant:

Description of plant:

Parts of plant used:

Used for: