# ASU DATE PALM STEWARDSHIP

## HISTORY

The Salt River Valley of Arizona is one of the few areas in the United States where date palms may be successfully cultivated for fruit production. Date palm offshoots were first imported into Tempe, Arizona about 1890, with the first commercial date gardens being established in the early twentieth century. The Salt River Valley was also home to two of the earliest date palm research stations in the U.S.A, the USDA Tempe Date Garden and the University of Arizona Agricultural Experiment Station, both located in Tempe.

Date production in Arizona increased until the 1940's when nearly five hundred acres of dates were planted in commercial gardens, the majority in the Salt River Valley. Today, with greatly increased urbanization this acreage has been drastically reduced.

The traditional date harvest at ASU can vary according to weather conditions and the amount of staff man hours available. In 2001, ASU's date-palm collection yielded approximately 4,000 pounds of dates. At that time there were 450 palm trees located at the Main Campus Arboretum, the ASU Horticultural Resource Center and ASU Research Park. The 2001 harvest was primarily Medjools, with about 500 pounds of Khadrawys.

ASU's date-palm collection comprises more than 50 varieties, including more common varieties such as Medjool, Black Sphinx, Khadrawy, Zahidi, Honey and Halaway, and a number of rare varieties such as Peggy Ann, Deglet Beida, Bentamoda and Taj. ASU has the largest date palm collection of any public garden in the country. To keep many of these varieties alive, the former ASU Horticultural Resource Center (HRC) was active in developing a "germplasm" collection of young palms, to preserve propagation material. Date palms are propagated not from seeds, but from the offshoots that grow from the base of the tree. However, seeds are used to develop new varieties of date palms.

After the ASU Horticultural Resource Center property was sold in 2002 most of its germplasm date palms were moved to the new Polytechnic campus. These younger palms are now available for the ASU Arboretum Volunteer Date Palm Stewardship.

The flowers have to be hand-pollinated -- workers manually collect the pollen from the male flower and deposit it on the female flower. This is done because although Arizona's hot climate is conducive for date palm cultivation, the winds here are not strong enough for natural pollination to occur. Also, the female flower is not fragrant and does not attract insects. While they ripen, the fruit is covered with net bags to protect it from birds. Then the fruit is harvested, cleaned, boxed and sent to the ASU Foundation (*traditionally 800 boxes go to the ASU Foundation, and the rest are sold at the Book Store*), which runs the Date Distribution Program. The boxes are sent as gifts to supporters of the University as part of a promotional program.

The ASU date palm collection is disease-free. In recent times, deadly microbial diseases including the "Bayoud," which wipes out 95 percent of all date palms in a given area, have swept across parts of North Africa, including Morocco and Libya. Iraq, which had the largest number of date palm varieties, lost many of the varieties after Operation Desert Storm.

A few of the date palm varieties at Arizona State University

| VARIETY | ORIGIN |
|---|---|
| Khadrawy | Iraq |
| Zahidi | Iraq |
| Dayri | Iraq |
| Honey | California |
| Halawy | Iraq |
| Saidy | Egypt, Libya |
| Bentamoda | Sudan |
| Deglet Noor | Algeria |
| Deglet Beida | Algeria |
| Thoory | Algeria |
| Barhee | Iraq |
| Khisab | Saudi Arabia |
| Khalasa | Saudi Arabia, Oman |
| Hayany | Egypt |
| Maktoom | Iraq |
| Rhars | Algeria |
| Black Sphinx | Arizona |
| Medjool | Morocco |
| Black Abada | California |
| Ashrasi | Iraq |
| Khir | Saudi Arabia |

We will be using organic fertilizers at the Polytechnic Date Grove-- compost, hydrolyzed fish and compost tea. This document was originally written for the local homeowner and the chemical fertilizer information has been left in this document for comparison.

The year long-date palm harvesting process is outline in the following pages.

JANUARY
Begin the year by removing any dead or dying fronds and fruit and flower stalks from the previous seasons' growth. Leaf spines from the current season's growth may also be removed by using a machete, pruning hook, pruning shears or other similar instrument; be sure to wear leather gloves and long sleeved shirt! You must have an adequate basin or berm around the trunk to ensure that sufficient irrigation water will stay in the root zone area. If you are using an automated irrigation system, check

for broken pipes, plugged nozzles, etc. A bubbler or flood irrigation system is usually best for quality fruit production. This is also a good time to add more drippers to expand the watering radius under the trees.

FEBRUARY

Any of the previous month's work may be completed in early February as well. In the second half of the month and into early March, before the palm flowers open, *apply a fertilizer mix with a ratio of 4-1-6-2 Mg (nitrogen, phosphorus, potassium, magnesium). An example of a fertilizer easily obtained utilizing this ratio would be an 8-2-12-4. Nitrogen, potassium, and magnesium should have equivalent percentages of each nutrient in controlled-release form*. Before fertilizing, a soil test is recommended. Water fertilizer in well. Organic fertilizers such as composted manure, compost, etc., may also be used. Before applying fertilizer, make certain the irrigated area of the soil is receiving adequate drainage. Probing the soil with a pipe, reinforcing rod, soil probe or other similar instrument to check for excess water may do this. Date palms are heavy users of water for successful fruit production. However, they must have adequate drainage or root rot and eventual death may occur. If drainage needs to be corrected, the soil should be aerated using one of the above-mentioned tools. It may also be improved by using compost and mulch.

MARCH

Begin collecting pollen as soon as the flower sheaths on the male palms have fully developed and are almost open. This usually begins in March and continues through April. The male flowers may be distinguished from the female by having a much broader sheath and flower head inside. When the sheath has opened, there will be hundreds of small star-shaped flowers on numerous strands originating from a large central stalk. The pollen is a creamy-white powder with a mild scent, which spreads profusely when mature. It can be collected and used immediately if the female palm is ready to be pollinated. If not, it should be stored in a cool, dry area with good air circulation. The female flowers are in a smaller, narrower sheath and resemble strands of pearls. They are ready to be pollinated when the sheath has just started to open. For best fertilization results, pollinate when the small, round flowers are a creamy-white color. Depending upon variety, location, and age of the palm, the female flower sheaths open during the same period of time as the males. They may be pollinated by several methods including rubbing the pollen on fertile flowers, dusting over the top or placing a male flower stalk on the top of the female palm. If a limited amount of pollen is available, the pollen can also be mixed with an inert substance such as flour or talcum powder to make it go farther. Only a very small amount of pollen is needed for fertilization to take place. This can also be accomplished with cotton balls dusted with pollen and placed inside the female spathe of blooms.

APRIL

Most female date palms do not have all of their flower sheaths open at the same time. A second pollination is frequently required about two weeks after the first; sometimes a third pollination may also be required. Remember correct timing of

pollination is extremely important for good fruit set! Once a flower stalk has been pollinated, it should be marked by tying a string around the flower bundle to indicate that pollination has been completed. This will eliminate any guesswork during the second or third pollinations.

MAY

Unlike many plants, date palms are normally reproduced asexually by small side shoots called pups or offshoots rather than by seed. Propagation by seed is unreliable, as approximately ½ of the seedlings will be males, and females produced from seed do not normally stay true to variety; they will have characteristics different from those of the mother palm. The best time to propagate dates from offshoots is normally from May through August. For successful offshoot propagation to occur, a number of factors need to be taken into consideration. For best results, the offshoot to be taken should be at least six to eight inches in diameter at the woody base. The area where the mother palm and offshoot join together should have the soil removed to a depth of several inches to expose the roots of the offshoot. Before detaching the pup, the fronds should be tied tightly together, ¾ up from the top, with the excess foliage above the tie being removed. This will help reduce transpiration (water loss from leaves) during the time of transplant shock. A large hammer and chisel are needed to sever the connecting tissue between the mother and the pup. Be sure to get roots with the pup; do not simply cut the top off. Once the cut has been made, take the offshoot and plant it in a previously prepared hole slightly deeper than it was growing on the mother palm. Leave the top tied until new growth occurs. The offshoots may also be planted in containers in a holding nursery and planted out the following spring. The tied fronds may die, but by fall new leaves should be showing. Do not discard until the following spring unless the trunk is soft. Give offshoots time. They often surprise you. Keep the new offshoot well watered, but allow it to dry out a little between watering. Unless there is heavy leaching due to over irrigation, water-soluble fertilizer should be very effective. High nitrogen fertilizers are not recommended for palms. For palms in general, it is recommended that a granular fertilizer be applied to the soil at a rate of 1.5 lbs (N)/100 sq. ft. of canopy area 4 times a year, or 1 lb (N)/100 sq. ft. of canopy area 6 times a year. Fertilizing is most effective during months when the soil temperature is 70° F or higher. Fertilizer should be broadcast over the soil and watered in. For established palms, one to two applications of these types of fertilizers yearly are sufficient. Faster release fertilizers are best not applied during the latter part of the fruit production season. May and June are the best months to remove flower stalks on trees that have not been hand pollinated. This prevents the formation of inedible fruit that takes nutrients from the mother tree. This fruit will drop in the fall producing a mess on drives, sidewalks and lawns.

JUNE

Fruit thinning with earlier flowering specimens usually begins in May and continues into June. Fruit thinning should begin at least by the time the fruit is pea-sized. The center stalk with the individual strands should have approximately one third of its total length removed at pollination using a knife, pruning shears, or similar

instrument. The remaining individual strands should be thinned to leave a total of fifteen to twenty fruits per strand and about thirty-five strands per individual fruit stalk for mature palms. Younger palms should be thinned more heavily. Remember the earlier you are able to thin the fruit the better, as the remaining fruit will have additional energy for better growth. When the fruit stalks are long enough to be pliable, usually at the time of thinning or shortly afterwards, they should be carefully tied down to a frond in an arch-like position. They should be tied so the fruit clusters hang freely, but still give support to the fruit stalk so it will not break from the weight of the growing fruit. When working with some varieties such as Medjool, extra care needs to be taken when tying down the stalks, as they tend to be especially brittle. For a mature, healthy date palm, ten to twelve fruit stalks may normally be left without "overloading" the palm. Younger palms or those mature palms that are not in the best health should have fewer fruit stalks left. If a palm has been overworked (not thinned heavily enough) for fruit production it may go into alternate bearing (produce little to no fruit on alternate years).

MID TO LATE JULY

The earlier varieties of dates will begin to change color from green to red or yellow. The green stage is known as kimri. The red or yellow stage is known as khalal. The red dates will normally turn black when ripe and the yellow will turn brown. When the khalal stage is reached, the fruit clusters should be covered with bags to prevent damage from birds. The bags may be made of a porous material such as a lightweight burlap-type material or cheesecloth. They may also be made of a waxed paper material with an open lower end. While it is important to protect the ripening fruit from birds, it is equally important to safeguard them from spoilage caused by poor air circulation and excess heat build up by using an unsuitable type of material for the bag. One producer in the southwest California area uses old dresses.

SEPTEMBER - OCTOBER

Depending upon weather, some early varieties will begin to turn brown or black into the stage known as rutab. Most varieties may be "bunch cut". The entire fruit cluster is cut off at one time when ¾ or more of the fruit cluster has advanced to the rutab stage. Extremely late varieties such as Khisab or Khalasa will not be ready for harvest until December or even later. Medjool and certain other varieties are usually best not harvested by bunch cutting. They should be harvested by a "thinning harvest" in two to sometimes three separate stages, usually one to two weeks apart. This type of harvesting can be accomplished by shaking the fruit bag while holding another bag, tray, or large tub down below. Most of the dates that fall will be ripe. This type of harvest may be used on all dates to assure maximum harvest of useable dates.

SEPTEMBER

Harvesting will continue with the earlier varieties such as Khadrawy and Halaway and continue on with mid-season varieties such as Medjool and Zahidi. After the fruit has been harvested, it should be placed in a tray with a screen or other type of porous bottom and rinsed off with a light spray of water. Avoid over cleaning the fruit as

excessive washing may damage the fruit. Use only water for washing. Once the dates have been cleaned they should be allowed to thoroughly air dry. When they have completely dried they are ready to be eaten or put into storage. They dry best at 90ºF. Soft date varieties such as Black Sphinx and Barhee should be refrigerated if not used right away. If a longer storage period of 2-3 months or more is desired they are best frozen until ready for use. Semi-soft varieties such as Medjool and Halaway will keep longer than soft varieties, but will last longer if kept refrigerated or frozen. Semidry varieties such as Zahidi and dry varieties such as Thoory will keep for a considerable length of time at ordinary room temperatures, but may also be kept refrigerated if desired.

OCTOBER, NOVEMBER, DECEMBER

Continue to harvest the later varieties the same as the earlier ones and follow the same storage procedures.

RECOMMENDED READING

1. "Dates, Imported and American Varieties of Dates in the United States," Donald R. Hodel and Dennis V. Johnson, University of California Agriculture and Natural Resources, Publication 1498.

2. "Growing and Processing Dates," University of Arizona Cooperative Extension Service, Bulletin #8330.

3. "Dates in Arizona," University of Arizona Cooperative Extension Service.