



Master Gardener Citrus Clinics

Master Gardener Journal

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 Maricopa County Master Gardeners
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CITRUS AND DECIDUOUS FRUIT SPECIAL SUPPLEMENT

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Master Gardener Journal

Everything you need to know to grow healthy citrus trees

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Maricopa County Master Gardeners: Cultivating Plants, People & Communities since 1980. Master Gardener volunteers are trained by University of Arizona faculty and staff during a 17-week course. They provide educational leadership to the community with research-based horticulture knowledge. Volunteers promote efficient use of water, fertilizers, and pesticides, and preservation of our desert environment.

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Citrus trees are favored plants for desert landscaping. Fresh citrus, ready to be handpicked, is an easy-to-grow treat. As another positive feature, the trees can have a long life. One of the three original Washington navel orange trees that launched the citrus industry in the United States is still producing fruit! It was planted in 1873 in Riverside, California. Although citrus probably won't live that long in your backyard, it can thrive for many years with proper care.

Important considerations when selecting trees include location in the landscape and overall size at maturity. Many factors influence how well a citrus tree will grow, including the summer's intense afternoon sun, distance from buildings, overhead wires, and other plants, as well as cold spots in the winter.

Tree Size

It is essential to plant trees in a place that will allow them to reach full size without obstruction or excessive pruning. Mature adult citrus trees average 20–25 feet tall and 16–18 feet wide. Dwarf varieties usually grow to 10–12 feet tall and 9–11 feet wide. If you do not want tall trees or if space is at a premium, consider planting dwarf citrus trees. Dwarf varieties produce the same size and quality of fruit but yield about 50–60 percent less. This is still sufficient fruit and it is easier to harvest from a shorter tree.

When determining where to plant the tree, choose locations that are:

- Away from all power lines and overhead wires. Do not plant under wires!
- Far enough away from buildings, fences, other trees, and property lines to allow the tree to reach its mature size.
- Protected from late afternoon sun or

western exposures. During summer, the sun's intense rays can burn the skin of the fruit, especially if it is not shaded by the tree's leaves. Even with protection, some fruit loss is to be expected on healthy trees, especially during extremely strong winds or spring months, when trees drop excess fruit.

- Protected from cold spots during winter months (November through February). Citrus trees are frost tender. Cold air flows to lower elevations. If you live at the base of hills or mountains, or have low areas in the landscape, you will likely have cold spots where the temperatures drop lower than the official weather report.

Varieties

There are many types of citrus that grow in the low desert, including oranges, grapefruits, lemons, limes, mandarins (also called tangerines), tangelos, kumquats, limequats, and even hybrid crosses between grapefruit and pummelo. For each type of citrus, there are many varieties with different characteristics from which to choose. Do spend some time selecting varieties that suit your needs.

An important characteristic is the taste of the fruit. However, flavor can vary depending on weather conditions, the tree's health, and when the fruit is harvested. The Citrus Harvesting Calendar for the Low Desert shows the range of dates when fruit is most likely ready to be eaten. You may use this as a guideline to choose varieties to extend your harvest season or to be available for harvest when convenient to your schedule. The varieties listed grow well in the low desert environment.

Navel Oranges

Navel oranges are favorites for eating fresh, because they are seedless and easy to peel. They can be juiced, but

the juice cannot be stored because navel oranges contain a compound called limonin, which produces a bitter taste. A drawback of navels is their sensitivity to heat. The plant will drop many, if not all, of the fruits in early summer. People are sometimes disappointed in the quantity, not quality, of fruits.

Parent Washington is one of the most popular navels grown in the low desert. This mid-season navel variety produces a large fruit of good quality. It is ready for harvest beginning around Thanksgiving or the first of December. Other mid-season navels include **Atwood**, **Fisher**, **Newhall**, **Robertson**, **Spring**, and **Thompson Improved**.

Fukumoto is an early-season, medium-sized navel that can be harvested starting in late October or early November. Due to its early maturity it may not have full orange peel color at harvest, although it is ready to eat. This variety is recommended only on Sour Orange rootstock in Arizona because recent test trials show evidence of rootstock incompatibility with Carrizo.

Beck Early is another early-season navel that can be harvested starting in late October or early November. Depending on climatic conditions, this navel tends to be more oblong in shape.

Lane Late is one of many new Australian late-season navels. Although these are often called summer navels, they can be harvested beginning in January in the low desert. There are over 13 different varieties of late navels with the Lane Late being one of the most promising in recent Arizona trials. Other varieties include **Autumn Gold**, **Barnsfield**, **Chislett**, **Powell**, and **Summer Gold**.

Cara Cara shows off crimson flesh similar to red grapefruit. The flavor and peel color of the Cara Cara is similar to other navel orange varieties. Fruit segments are attractive in salads due to the crimson color.

Sweet Oranges

“Sweets” is a term commonly used to refer to a group of sweet orange varieties that are good for both juice and eating fresh.

Diller originated in Arizona and is a small to medium fruit with comparatively few seeds. This variety is popular due to its productivity and is excellent for juicing.

Hamlin is an early-season sweet orange that performs well in the low desert. The fruit is medium in size with 0–6 seeds per fruit. (Note: 0–6 seeds per fruit is considered “seedless.”)

Marrs is another early-season, sweet orange that is a semi-dwarf tree. The fruit is medium to large in size and has 7–10 seeds per fruit. It reaches maturity early in the season and is best when it fully ripens in November.

Pineapple produces medium-sized oranges with 15–25 seeds per fruit. It is very productive; although, it tends to bear in alternate years. The variety was named Pineapple because of its fragrance.

Trovita is an excellent sweet orange and produces well in Arizona’s low desert. The fruit is medium to large with 6–10 seeds per fruit.

Valencia Oranges

Valencia oranges are known for their excellent juice, which has a deep orange color and high sugar content. The fruit does not reach maturity until about March, after the earlier-maturing navel oranges have been harvested. Thus, the valencia is a welcome orange when others are no longer available. The fruit is medium in size with few seeds (0–6). Two popular varieties that have performed well in Arizona’s low desert are the **Campbell** and **Olinda**. Two newer seedless varieties are the **Delta** and **Midknight**.

Pigmented or Burgundy Oranges

In cool climates, pigmented oranges are characterized by the dark red color they develop, both internally and on the peel, hence the common name “blood oranges.” However, in the warm climate of the low desert many of the blood oranges fail to achieve this typical color. It develops best after a hot dry summer followed by a cold winter. Varieties of blood oranges that may or may not develop this coloring, depending on the climate, are **Moro**, **Ruby**, **Sanguinelli**, and **Tarroco**.

Mandarins (Tangerines)

Mandarins are popular because most of the varieties are easy to peel and section well. The peel is thin and, when ripe, may “plug” (a section of the peel where the stem was attached is removed if the fruit is pulled from the tree). If you are going to store mandarins it is advisable to cut the stem of the fruit from the tree to prevent plugging that otherwise may lead to desiccation or decay. Many mandarin varieties bear fruit in alternate years.

Algerian (also called Clementine) is an early-season mandarin ripening in November. Fruit size is small to medium. Cross-pollination will increase fruit production and the number of seeds per fruit. If the tree is self-pollinated it produces less fruit with fewer seeds.

Daisy is an excellent early season, very sweet, red/orange mandarin. Fruit size is medium to large, with 0–5 seeds.

Dancy is harvested beginning in December. Fruit is medium in size with 6–20 seeds. Dancy tends to bear fruit in alternate years.

Fairchild is a popular early-season mandarin in Arizona’s low desert. The fruit is medium in size and ripens in November about the same time as the

Algerian. The trees tend to produce more fruit with cross-pollination, but also more seeds. They are alternate bearing.

Kinnow is a popular late-season mandarin maturing in January in the low desert. The fruit is medium in size and has numerous seeds if cross-pollinated. Kinnow is very likely to be alternate bearing. This variety is very sweet when ripe.

Tangelos

Tangelos are hybrids resulting from the cross of mandarin and grapefruit or mandarin and pummelo. Pummelo fruit resembles a very large grapefruit but has sweeter, firmer flesh and a thicker peel.

Minneola is a hybrid of Duncan grapefruit and Dancy mandarin. Fruit matures beginning in January. The bright, orange-red fruit is large and pear-shaped and usually has a fairly prominent neck. The fruit has 7–12 seeds. Cross-pollination with Dancy, Algerian, and Kinnow mandarins is recommended for better fruit production.

Orlando is the result of the same cross as the Minneola but is distinctly different. The fruit is medium in size without the neck. Harvest begins in November. There can be anywhere from 0–35 seeds. Cross-pollination is recommended with Algerian, Dancy, or Kinnow. This is one of the best juicing fruits available.

Grapefruit

Grapefruit varieties can be divided into two natural categories: white and pink (also called blush or red). Although there is greater demand for pink grapefruit due to a misconception that it is sweeter, white grapefruit is just as sweet if allowed to fully ripen on the tree.

SELECTING CITRUS

Duncan is one of the oldest white grapefruit varieties and, according to some, the best-tasting grapefruit. However, it is seedy (30–70) and lost favor after the Marsh was introduced.

Marsh is the most common and widely planted white grapefruit in the low desert. Although the fruit is ready to harvest in December, it will continue to mature and become sweeter with time if left on the tree. Fruit is typically best from March through May after acid levels in the fruit have declined. Grapefruits are large with only 0–6 seeds.

Redblush (Ruby Red) was one of the first pigmented grapefruit varieties. It has large fruit with few seeds (0–6). The internal color is a light pink. Fruit is usually picked beginning in December, but becomes better the longer it remains on the tree. Interior fruit color becomes golden in spring.

Flame is a new release from Florida producing large pink fruit with few seeds (0–6). The fruit is mature beginning in December. Flame is being evaluated for the low desert.

Rio Red produces a large fruit with few seeds (0–6). The flesh is one of the darkest pinks and the peel may develop a red tint. Fruit is picked beginning in December; however, it can still be harvested as late as July.

Texas Star Ruby produces the darkest flesh color of any variety. However, it is not recommended for Arizona's low desert. The trees are sensitive to hot summers and leaves will sunburn more readily than other citrus trees. Temperatures above 115 degrees Fahrenheit may prove fatal to these trees.

Grapefruit x Pummelo Hybrids

These hybrids are vigorous growers, producing large fruits that can weigh several pounds.

Melogold hybrid has retained more of the pummelo characteristics. The fruit is large, has a thick peel, and a distinctive taste with a high sugar content. It is less acidic than grapefruit.

Oro Blanco fruit is about the size of a grapefruit with a slightly thicker peel. The fruit is lower in acid and higher in sugar than grapefruit and has a pummelo flavor. The flesh provides an excellent sweet taste, but the membranes between the segments are somewhat bitter.

Lemons

Lemons are typically treated with ethylene gas by commercial growers to develop the yellow color early in the season. Fruit can be harvested when green and used well before the rind turns yellow at maturity. Lemon trees are more frost sensitive than most other citrus.

Eureka is ridged, with a rough rind surface and a small or less pronounced nipple. The tree is thornless.

Lisbon fruit is medium in size and characterized by a prominent nipple. The rind is smoother than the Eureka.

Ponderosa is most likely the hybrid of a lemon and a citron, which has thick-skinned fruit similar to lemons. The Ponderosa is more characteristic of the citron than a lemon and although edible, is often grown as a garden ornamental. The acidic fruit is the size of grapefruit and has a thick peel.

Limes

Note that limes are extremely frost sensitive and need to be planted in warm areas or protected from frost.

Mexican lime (also called Key Lime) ripens in September. The fruit is small and prized because it is flavorful and juicy.

Tahiti (also called Bearss or Persian) is believed to be a hybrid between the small acid lime and possibly the citron. The fruit ripens in June and is larger than the Mexican lime.

Kumquats

Fukushu has small, bright orange fruit that can be entirely consumed, peel and all. It is a small, symmetrical tree with attractive dark green leaves and is a beautiful landscape or container plant.

Meiwa has round fruit with a spicy-sweet peel and pulp. The fruit is used for preserves and candied fruit.

Nagami is more oblong than the Meiwa, more acidic, and has a brighter orange color. The Nagami and the Meiwa trees are used in home and commercial landscaping and are cold hardy to about 18–20 degrees F.

Limequats

Tavares is a hybrid (East Indian lime x oblong kumquat). The fruit is characteristic of the kumquat but has a small neck. The trees are popular in home landscaping, and the fruit may substitute for lime as a condiment. The limequat is not quite as cold tolerant as the kumquat, perhaps hardy at 21–23 degrees F°.

Read the Tag

When buying citrus, it is recommended that trees be properly tagged with the fruit variety, the rootstock, and the original grower's name so that you know exactly what you are getting. For example, a tag might read:

Variety: 'Lane Late' navel orange
Rootstock: Troyer
Grower: "Mighty Sweet Citrus Company"

PLANTING CITRUS

Citrus trees are purchased in a container with an intact root ball, as opposed to deciduous fruit trees, which are sold as bare-root plants. Citrus trees are cold-tender, so plant them in the low desert after danger of frost has passed. March and April are the best months to plant citrus in the low desert. Spring is their most vigorous growing time and the root structures can expand rapidly as the temperature warms. However, citrus can also be planted from October through February but will need protection against frost. By planting in fall, the roots have more time to develop prior to the heavy demands of summer.

Young two-to five-year-old trees transplant most successfully. Larger, older trees are more costly, harder to transplant without injury (to yourself and the tree), and suffer more from transplant shock. It will generally be two to three years after transplant before a tree starts bearing significant quantities of fruit. That is the same whether you plant a two-or ten-year-old tree, so save work and money by purchasing a young tree.

To plant citrus, dig a hole three to five times wider than the container. For a one-gallon pot, that is about one to three feet in diameter; for a fifteen-gallon pot the hole should be about three to six feet in diameter. Roots grow outward through the soil and loosening a wide area will help them spread and anchor the plant. The hole should be only as deep as the container. It is not necessary to amend the backfill or fertilize at planting. The bud union should be planted above ground, not buried. For more details on planting and hole preparation, see *Desert Landscaping for Beginners* (Arizona Master Gardener Press, 2001) or University of Arizona Cooperative Extension publication AZ1022, *Planting Guidelines: Container Trees and Shrubs*.

It is best not to allow grass to grow under young citrus trees because turf will compete vigorously for water and nutrients and will not thrive in the shade of the tree's canopy.

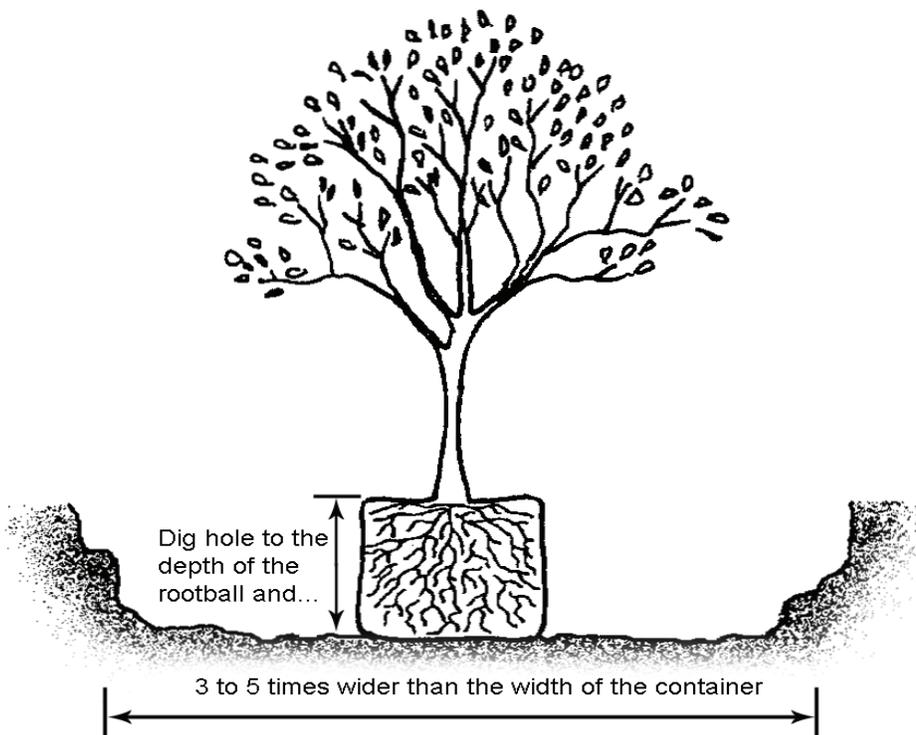
What is a Rootstock?

Citrus varieties with fruit that is good to eat are grafted onto a second citrus variety, which is called the rootstock. The bud union—where the graft took place—is usually visible as a slight bump or raised area towards the base of the trunk. The rootstock variety offers cold hardiness, resistance to soil-borne diseases, vigor, and/or the ability to thrive in different soil types. Usually, the fruit variety doesn't offer these characteristics and the rootstock variety doesn't bear high-quality fruit. However, together they can produce a long-lived tree with tasty citrus.

For many years Sour Orange rootstock has been the recommended choice for citrus in the low desert. It is adaptable to harsh climates and heavy clay soils, pest and disease resistant, frost tolerant, and it positively influences fruit quality. However, a threat to citrus on Sour Orange rootstock is the Citrus Tristeza Virus (CTV). Once the rootstock is infected with CTV, the tree will die. This virus has effectively eliminated Sour Orange rootstock trees in South America and is active in Florida.

CTV has been identified in Arizona, although the citrus brown aphid that carries this virus from tree to tree has not yet been detected. Alternate rootstocks that are resistant to CTV are available. In the low desert, Carrizo or Troyer rootstocks are good choices for full-sized trees and Flying Dragon for dwarf citrus.

When buying citrus, it is recommended that trees be properly tagged with the fruit variety, the rootstock, and the original grower's name so that you know exactly what you are purchasing.



WATERING CITRUS

Watering effectively is the most important thing you can do to maintain healthy citrus trees. Apply water at the canopy edge (drip line) and one foot beyond. This is where the roots' growing tips are absorbing water and nutrients. You might want to build a berm or water well around the tree to hold irrigation water in this zone. Do not build a berm up close to the trunk. Over time, as the berm erodes, the soil mounds against the trunk. Wet soil against the bark creates more of a problem than standing water against the trunk. Water will soak into the soil, whereas wet soil will remain and promote conditions favorable to the spread of fungal disease.

Whatever type of irrigation system you use (drip emitters, bubblers, soaker hose, garden hose), expand the watering zone as the tree grows. This requires moving the existing irrigation components outwards, as well as adding more emitters or soaker hose to cover the larger area.

Use slow, deep applications of water that help leach—or push—salt build-up below the root zone to the bottom of the wet soil. Water should penetrate at least 18-24 inches initially. Increase the depth of watering on newly planted trees each year until the tree has been in the ground for three years. Water should soak about three feet deep for mature citrus.

Use a soil probe to determine how deeply water penetrates. (Any long piece sharpened metal or rebar will work.) The probe will move relatively easily through moist soil, but stop at dry, hard soil.

How Often to Water

The table below provides guidelines on watering frequency but adjust them as necessary for your conditions. Consider specific features at your site, such as soil type, elevation, and sun and wind exposure. Clay soils hold moisture well, so watering intervals may need to be extended to allow clay soil to dry out. Sandy or rocky soils drain quickly, so watering may need to be more frequent. Long-time gardeners realize that each year must be treated individually. Temperatures can be cooler one year than the last, or rainfall can be more plentiful.

The age of citrus trees begins with the first day you transplant them into your landscape. Newly planted and young citrus—up to three years old—require more frequent watering than mature, established citrus.

The frequency of application usually remains the same for mature citrus trees as they age. However, it may be necessary to increase the amount of water applied to satisfy the bigger root zone as a tree grows and the water well is enlarged to encompass its larger drip line.

Do not forget your citrus when you leave on vacation, especially if you are gone during the summer. Water is essential during the hot summer months when fruit is expanding. Set timers properly and check that all emitters, bubblers, and sprinklers are functioning. A reliable neighbor, friend, or gardener who will check your trees for proper care is an invaluable asset. Usually a weekly or biweekly check is adequate. If you do not have an automatic system, leave detailed instructions on handwatering. Do a trial-run with your plant sitter before you leave. You have spent a lot of time and money on your citrus: don't let it disappear while you're away!

APPLICATION INTERVALS FOR IRRIGATING CITRUS TREES¹

	Month				
Time after planting	Dec - Feb	Mar - Apr	May - Jun	Jul - Sep	Oct - Nov
0 - 1 month	every 2 - 3 days				
2 - 3 months	every 3 - 5 days				
4 months - 1 year ²	14 days	7 - 10 days	5 - 7 days	2 - 5 days	5 - 10 days
1 - 2 years	14 - 21 days	10 - 14 days	7 - 10 days	7 - 10 days	10 - 14 days
3 years or older	21 - 30 days	14 - 21 days	14 days	10 - 14 days	14 - 21 days

¹Adapted from *Irrigating Citrus Trees*, AZ 1151, by Glenn C. Wright.

²Mature trees watered with drip or microsprinkler irrigation should also be watered at these intervals.

MAINTAINING HEALTHY CITRUS

Fertilizing

Recent research demonstrated that fertilizing newly planted citrus is unnecessary. Fertilizer is not required until the tree has been in the ground for two years. However, you may apply small amounts of nitrogen after the tree is established and new growth has emerged. After they have been in the ground for two years, citrus trees become heavy nitrogen “feeders” and supplemental fertilizer is required to assure a good fruit crop and a healthy tree. It is important not to overfertilize, which may burn the tree roots. The amount of fertilizer to apply varies depending on the age and size of the tree, as well as the type of fruit. Established grapefruit trees requires less nitrogen than other citrus. The fertilizer table provides a simple way to determine the optimum amount of fertilizer to apply.

Citrus is fertilized three times a year with one-third of the tree’s total annual nitrogen requirements applied each time. Trees are best fertilized in January or February, April or May, and August or September. Nitrogen can be lost if fertilizer is left on top of the soil without watering it in immediately, or if it is applied to saturated soil. An effective method is to apply one-half of a tree’s

regular irrigation, spread fertilizer, then immediately apply the second half of the irrigation. Another simple method is to put the fertilizer into a bucket of water and pour the solution into the tree’s water well. Regardless of method, fertilizer should be applied at the edge of the tree’s drip line where roots can absorb it.

Mulching

Layer several inches of mulch around the base of the tree after planting. Mulch will help maintain soil moisture, reduce soil temperature, and inhibit weed germination. Do not let the mulch build up against the tree’s trunk, as that promotes an environment conducive to diseases and pests. Apply additional mulch each year. As it slowly decomposes, it adds nutrients to the soil.

Sunburn Protection

Sunburn can seriously damage a citrus tree, leading to a weakened resistance against diseases. The bark on the south or west sides of the trunk becomes discolored or black and may split, crack, or peel off, exposing the wood beneath to diseases and insects. Protect

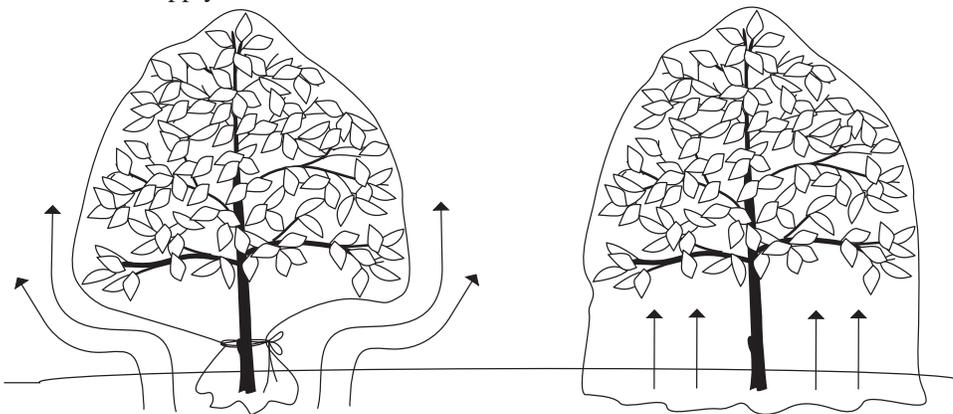
tree trunks or any branches that will be newly exposed to the sun. It is especially important to protect from late morning through late afternoon sun from April through September. An effective method is to paint the trunk or exposed branches with a white latex paint specifically designed for tree trunks. It is okay to paint over the bud union. Another method is to shade the exposed bark with a loose wrapping of cloth or newspaper (never plastic), and to remove it at the end of summer.

Frost Protection

Citrus are susceptible to frost and require protection if temperatures dip below the freezing point of 32 degrees F. Young trees in particular will need protection. Wrap the trunks with cloth, cardboard, or several layers of newspaper (never plastic) to protect them from the winter freeze. Leave the wrap on until the danger of frost is over, usually around mid-March in the low desert.

Cover plants with cloth or paper (not plastic) for insulation. You can use sheets or blankets for minimal protection or purchase frost cloth. A properly applied frost cloth can protect plants at temperatures from 20 to 30 degrees Fahrenheit, depending on the fabric and the weave of the cloth.

Completely drape the plant from the top all the way to the ground. Do not allow any openings for warmth to escape. This procedure will trap the heat radiating from the soil and maintain a more humid atmosphere around the plant foliage. Optimally, the drape will be supported by a frame that does not allow it to touch the foliage. Do not gather the drape around the trunk of the tree or plant. The goal is to trap heat being radiated from the ground, so ensure that the drape touches the ground at least as far out as the drip line or canopy.



INCORRECT
Heat radiating from soil travels around covering

CORRECT
Heat radiating from soil stays within covering

Continued on page 8

ANNUAL FERTILIZER REQUIREMENTS IN POUNDS FOR CITRUS TREES

All citrus except grapefruit ¹	Years after planting	Pounds of actual nitrogen required each year ²	Percentage nitrogen contained in various fertilizers ³						
			5 Blood Meal	10	15	21 Ammonium Sulfate	25	33 Ammonium Nitrate	46 Urea
Newly planted ⁴	0 - 1	0 - 0.12	0 - 2.5	0 - 1.25	0 - .75	0 - .5	0 - .5	0 - .33	0 - .25
Young	1 - 2	0.25	5.0	2.5	1.75	1.25	1.0	0.75	0.5
Small, young	2 - 3	0.50	10.0	5.0	3.33	2.5	2.0	1.5	1.0
Mid-size young	3 - 4	0.75	15.0	7.5	5.0	3.75	3.0	2.25	1.5
Small adult or adult dwarf	4 - 5	1.0	20.0	10.0	6.75	5.0	4.0	3.0	2.0
Mid-size adult or fully grown adult, trimmed	5 - 6	1.25	25.0	12.5	8.33	6.25	5.0	3.75	2.5
Large, fully grown adult, untrimmed	6 +	1.5	30.0	15.0	10.0	7.5	6.0	4.5	3.0

¹ Grapefruit trees five or more years after planting: use half of amounts shown.

² Pounds of fertilizer are rounded to the nearest quarter- or third-pound for ease of calculation.

³ Fertilizer products have three numbers on the package, e.g., 15-30-15. The first number is nitrogen content.

⁴ Newly planted trees usually require no fertilizer; however, you may apply small amounts of nitrogen after tree is established and new growth has emerged.

HOW TO USE THE FERTILIZER TABLE

1. In the left column of the table, find a description of the tree you plan to fertilize. The total pounds of actual nitrogen recommended for this tree for one year is indicated in a column to the right. Since no fertilizer is 100 percent nitrogen, use the chart to determine the amount of a specific type of fertilizer to use.

2. Look at the top edge of the table for the percent nitrogen that your fertilizer contains. By regulation, every container of fertilizer must have 3 numbers written on it. The first number indicates the percent nitrogen, the second the percent phosphorus, and the third the percent potassium. (For example: 21-0-0 has 21 percent nitrogen, no phosphorus and no potassium.)

3. The intersection of the row describing your tree and the column indicating percent nitrogen in your fertilizer is the number of pounds of that product to use during the entire year for that tree.

4. Give one-third of the yearly total of fertilizer during January-February, one-third during April-May, and one-third during August-September. (This is to prevent loss of nitrogen from the root zone and environmental concerns regarding the leaching of nitrates into groundwater.)

EXAMPLE 1: You have a young tree, planted one year ago and a bag of ammonium sulfate (21-0-0) that has 21 percent nitrogen. Find the row for a young tree. Find the column for 21 percent nitrogen. They meet at the number 1.25 lbs. Therefore, apply 1.25 lbs. ammonium sulfate during the year. Apply one-third of that amount (about 0.4 lbs.) during Jan-Feb, one-third in Apr-May, and one-third in Aug-Sep.

EXAMPLE 2: You have a mid-sized adult grapefruit tree, planted 5 years ago and "citrus food" fertilizer with 10 percent nitrogen. The row for this tree and the column for 10 percent nitrogen intersect at 12.5 lbs. Note that mature grapefruit trees require only half of the amounts listed. Therefore, the year's total will be 6.25 lbs. of your "citrus food." Weigh the fertilizer to obtain 2 lbs. Apply one-third (about 2 lbs.) during Jan-Feb, Apr-May, and Aug-Sep.

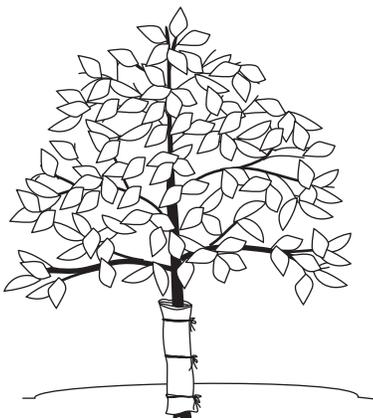
MAINTAINING HEALTHY CITRUS

Different types of citrus can survive different levels of cold weather. The trees can tolerate a few degrees colder than the ripening fruit can withstand. Kumquats are the hardiest citrus, withstanding temperatures around 18–20 degrees F; limes are the most cold sensitive, with leaf damage occurring around 30 degrees. Other citrus varieties fall somewhere in between. As a guideline, ripe navel oranges may be damaged when temperatures are below 27–28 degrees for more than three hours. Fruit on the outside of the tree is more likely to suffer damage than inner fruit protected by the canopy.

(For more details on frost protection, see University of Arizona Cooperative Extension publications AZ 1002 *Frost Protection* by Lucy K. Bradley and AZ 1222 *Protecting a Citrus Tree from Cold* by Glenn C. Wright.)

Pruning

Note that commercial citrus growers do not prune their orchards, so little pruning is required for a healthy, productive tree. Prune only to remove dead branches or to remove suckers on the lower trunk. Suckers are usually long, fast-growing shoots heading straight up. Prune suckers that are below the bud union, which will be the rootstock's variety, not the variety of fruit that you chose. Pruning should



take place in spring (in the low desert from late-February to early March) after all chance of freeze has passed, but before new growth starts. Avoid cutting off excess amounts of new growth and buds. This could significantly reduce the amount of fruit that the tree can bear.

Do not prune citrus trees during the summer, from April through September. When leaves are removed, this opens up the possibility of sunburn on the bark of the tree trunk or branches, as well as sunburning the fruit. Also, it is a good idea to leave the “skirt” branches that grow from the lower portion of the trunk. The fruit they produce can be easily harvested, and their foliage will shade the lower trunk.

What About Meyer Lemon?

Citrus Tristeza Virus (CTV) is a fatal disease of citrus. Meyer lemon can be a carrier of CTV but does not show symptoms itself. Thus, Meyer is illegal (and therefore not available) in the state of Arizona. However, Virus Indexed Improved Meyer lemons from certified nurseries are now allowed in the State. These trees have been certified to be free of the CTV virus at this time. This does not mean that they are immune or resistant to the virus. Meyer is not a true lemon, but likely a hybrid of a sweet orange and lemon.

When to Harvest?

After providing excellent care for your citrus trees, the payoff is luscious fruit. However, do not expect much of a harvest for the first few years after planting. It may take five or six years to develop a good crop. It is a good idea to remove fruit on trees that have been in the ground less than two years. This will promote stronger and faster root growth and a healthier tree.

The ultimate test of when fruit is ready to be picked is when it suits your palate! Generally, the longer citrus stays on the tree, the sweeter it will become. As the fruit ripens over time, its acid content goes down and its sugar content goes up. The degree of sweetness is dependent on several factors, including the fruit variety, when it is harvested, and past weather conditions.

Test the fruit to determine when it is sweet for your tastes and then continue harvesting while it remains viable on the tree. Once picked, the fruit will not become sweeter. Some fruit needs to be harvested over as little as a two-month period, while other varieties provide edible fruit for as long as seven to eight months, or longer, if the weather is favorable. Varieties such as the Ponderosa lemon or the Mexican Key lime can produce edible fruit year round.

Another factor is the fruit's variety. Different tree varieties will ripen at different times. To expand your harvest, plant varieties that ripen through an extended period.

The color of the fruit's rind is not a reliable harvesting guide because the color is affected by the weather. When it is cold enough, the rind will turn from green to yellow for grapefruit and lemons, and from green to orange for oranges. If the weather does not turn cold, some fruit may be ripe and edible even if the rind is green.

THE UNIVERSITY OF ARIZONA COOPERATIVE EXTENSION,
MARICOPA COUNTY

Citrus Harvesting Calendar for the Low Desert

Citrus Variety	Harvest Dates																							
	Jan		Feb		Mar		April		May		June		July		Aug		Sept.		Oct.		Nov.		Dec.	
	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15
Navel Oranges																								
Cara Cara	■	■																					■	■
Fukumoto																				■	■	■	■	■
Lane Late	■	■	■	■	■	■																		
Parent Washington	■	■																			■	■	■	
Sweet Oranges																								
Diller	■	■	■	■																			■	■
Hamlin	■	■																			■	■	■	■
Marrs	■	■	■																	■	■	■	■	■
Pineapple	■	■	■	■																			■	■
Trovita	■	■	■	■																			■	■
Valencia Oranges																								
Campbell			■	■	■	■	■	■	■	■														
Delta			■	■	■	■	■	■	■	■														
Midnight			■	■	■	■	■	■	■	■														
Olinda			■	■	■	■	■	■	■	■														
Pigmented/Burgundy Oranges																								
Moro	■	■	■	■																			■	■
Ruby	■	■	■	■																				
Salustiana	■	■	■	■																				
Sanguinelli	■	■	■	■	■	■																		
Tarroco	■	■	■	■																				
Mandarins/Tangarines																								
Algerian: (Clementine)																						■	■	■
Daisy	■	■																					■	■
Dancy	■	■																					■	■
Fairchild																						■	■	■
Kinnow	■	■	■	■																				■
Tangelos																								
Minneola	■	■	■	■																				■
Orlando	■																					■	■	■

Citrus Variety	Harvest Dates																							
	Jan		Feb		Mar		April		May		June		July		Aug		Sept.		Oct.		Nov.		Dec.	
	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15
Grapefruit - White																								
Duncan	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Marsh	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Grapefruit - Pink (Lightest-to darkest flesh color)																								
Flame	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Redblush	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Texas Star Ruby	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Grapefruit x Pummelo Hybrids																								
Melogold	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Oro Blanco	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Lemons																								
Eureka	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Lisbon	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Ponderosa	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Limes																								
Mexican Lime: (Key Lime)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Tahiti: (Bearss, Persian)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Kumquats = may have fruit year-round																								
Fukushu	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Meiwa	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Nagami	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Limequats																								
Tavares	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	

Conditions Caused by Insects and Disease

Citrus Thrips

Insects called citrus thrips may feed on the foliage and rinds of tiny fruit, usually starting in February and continuing into March and April. Thrips are difficult to see with the naked eye. A telltale sign of thrips is the curling and deforming of leaves as they grow larger. Shake citrus blossoms over a piece of white paper and look for tiny yellow insects (about one-sixteenth-inch long) that resemble wood splinters. The wings of adult thrips have a fringe of hairs when viewed under a magnifying lens.

As long as leaves stay green, they are still viable. Do not remove these leaves. Thrips may also scar new fruit as it forms, but this damage is cosmetic only and will not affect the fruit's edibility. Do not use insecticides, as spraying at this time can kill the pollinating insects, thus decreasing the tree's fruit production. Often the thrips are gone before their damage is noticed, so no control is necessary.

Damage from thrips will become more evident as leaves and fruit grow larger as the year progresses. Mandarins and tangelos are preferred hosts, so more fruit and leaves may be affected on these trees than on other citrus.

Phytophthora

Phytophthora fungi live everywhere in the soil. It is a water-borne fungus, requiring moisture to move. Because this disease can quickly kill citrus within a year, your best course of action is to prevent it from taking hold by using resistant rootstock and practicing good cultural techniques. Sour Orange rootstock is highly resistant to phytophthora; however, it is vulnerable to CTV disease carried by the brown

Conditions Caused By Weather

The following conditions are fairly common with citrus and need not be a cause for alarm. If you follow the guidelines for effective irrigating and fertilizing, you will have healthy citrus trees that should survive most demanding weather conditions.

Fruit Drop

Fruit from pea-size to golf-ball-size will drop from citrus during May and June. Citrus trees set many times more fruit than the tree is capable of supporting; therefore, natural thinning occurs. Nothing needs to be done, other than disposing of the fallen fruit. Despite what seems like a large amount dropping off, a normal amount of fruit will remain. Fruit drop can be worsened by hot weather and high winds.

Leaf Drop

Leaves may turn yellow and fall off. Some leaf drop is normal for citrus, particularly in the late winter and early spring as new growth begins. Unusually heavy leaf drop may be caused by overfertilizing or improper watering.

Fruit Split

Fruit may start splitting in September or October, due to either a sunburned rind or a tough rind that can not expand as the fruit grows. The latter is caused by insufficient water during the summer when fruit is developing. There is no treatment. Mark your calendar to irrigate carefully next summer.

Citrus Mesophyll Collapse

This condition will show itself by leaves and fruit drying up and dropping off, whereas stems and branches will remain vital. Rarely is the entire tree afflicted. Grapefruit is particularly susceptible, and it is not uncommon for grapefruit trees to be affected and other citrus in the same landscape to be free of problems.

Mesophyll collapse occurs when there are sudden, unseasonable weather changes. For example, temperatures might become abnormally cold in October for a few days or a week and then warm up to above-average temperatures in November. This extreme fluctuation stresses the trees, as they plunge in and out of dormancy. It is especially stressful if the summer was dry, with little relief from summer rainstorms.

If mesophyll collapse happens, clean up fallen fruit to prevent fungal and bacterial diseases. Maintain a consistent irrigation schedule and your citrus should produce leaves again in the spring. Do not prune out any defoliated branches until spring, and then only after the tree has completely leafed out. You might inadvertently cut out living branches.

TROUBLESHOOTING

citrus aphid which is projected to become a problem in the future. (In practice, Sour Orange is not always available for purchase; Carrizo is becoming a more popular rootstock for the low desert.)

Phytophthora can enter a tree when wet soil is allowed to stand against the trunk for extended periods or through bark wounds. The bud union is a slightly weaker, therefore easier, spot for disease to enter, so choose trees that are grafted at least six inches above the soil line. This makes the graft less likely to come into contact with water. Do not let lawn sprinklers overspray onto the tree. Keep the area near the trunk as dry as possible.

Phytophthora is most likely to affect older established citrus on Sweet Orange or Rough Lemon rootstocks. It kills the bark. Bark peeling off below the bud union is a common sign of this disease. It also shows up as a brown, oozing gum (like dark, thick honey) on the trunk and branches, or the roots may have brown or black lesions. These symptoms account for the disease's common names of "brown rot" or "foot rot gummosis."

If your citrus tree is infected with phytophthora, remove any infected bark, as well as a half-inch buffer zone of healthy tissue. Treat the wound with a Bordeaux fungicide paste. Apply metalaxyl or tris-Aluminum as a drench. These are systemic fungicides that will enter the roots and kill phytophthora in the soil and roots. Follow product instructions exactly when using any fungicide.

Alternaria (Navel End Rot)

This fungal disease may show up on oranges and also on Minneola and Orlando tangelos. It's primarily a problem when storing fruit, but it sometimes occurs on the tree where it can cause premature fruit drop. The

decay may appear as a dark spot on the navel end (blossom end) of the fruit while it is still on the tree, but it can be difficult to see. The rot may be restricted to the end of the fruit, or the brown to blackish discoloration may eventually spread and even extend deep into the central cavity. The tips of several fruit segments may display a dark rot, and the juice of the entire fruit will have an unpleasant taste.

The fruit may dry and become black and mummy-like in appearance.

This disease is spread by airborne fungal spores. The best control method is to eliminate overhead sprinklers which can spread spores, prune out dead wood that can host the fungi, and dispose of fruit that has fallen to the ground. There is no effective fungicide spray. Refrigerating the fruit will stop the progression of the disease.

FUN FRUIT FACTS

Q & A

Why does my citrus have thick rinds?

There are several causes of thick rinds. First, our desert environment's lack of humidity leads to thicker albedo development. (See A to Z on page 19.)

Second, vigorous rootstock is a factor. Grapefruit on Volkameriana or Rough Lemon rootstock will always have a thicker peel than grapefruit on Sour Orange or Carrizo rootstock.

Third, overfertilization with nitrogen can cause thick rinds. In some years, when trees bear fewer fruits than usual, but are fertilized normally, the amount

of nitrogen available for each fruit is greater, and rinds become thicker.

Why does lemon juice sprinkled on fruits such as peeled apples, pears, and peaches prevent them from turning brown?

Oxidation is a chemical reaction to oxygen in the air, which causes light-colored fruits to turn brown. Lemon juice contains high quantities of Vitamin C, or ascorbic acid, which is an antioxidant. Sprinkling an antioxidant on the fruit reacts with its enzymes preventing them from turning brown.

Use It!

- Wash the fruit carefully before removing zest with a citrus zester or a grater with small holes.
- Store fresh squeezed lemon juice in a tightly closed container for up to three days in the refrigerator.
- Do not cook recipes that use a large amount of lemon juice in an aluminum pan. Food can pick up an unpleasant metallic taste.
- Lemon juice enhances flavors. Reduce the amount of salt in a receipt by using a "squirt" of lemon juice.

URBAN MYTHS ABOUT CITRUS

Several mistaken beliefs crop up periodically about growing citrus and circulate by word-of-mouth. Learn the real scoop below. More details can be found within the publication where noted.

Fertilizer should not be applied while the tree is blooming.

FALSE (Bloom is not a factor for fertilizing periods. Apply fertilizer three times per year, with one-third of the tree's total annual requirements at each feeding.)

Trees are fed in January or February, April or May, and August or September.

TRUE (See Page 6 and 7 for fertilizing requirements, including a chart showing how much nitrogen to apply.)

Lemons must be yellow and limes must be green when consumed.

FALSE (Rind color is not a reliable indicator of when fruit is ready to use. See Page 8 for more information on harvesting ripe fruit.)

Adding organic matter to the backfill is necessary when planting citrus trees.

FALSE(Experts do not recommend adding organic matter, such as compost or mulch, to the planting hole. A highly amended planting hole creates an artificial environment.

Tree roots establish better if they are planted in the same soil type as they must ultimately spread out into if the tree is to survive. Also, air pockets in the organic matter cause the planting hole to sink, allowing the tree to sink below-grade or lean at an angle. See Page 4 for transplanting instructions.)

Water should never touch a citrus tree trunk.

FALSE (The concern is that a water-borne fungi called Phytophthora may invade the tree and ultimately kill it. Phytophthora is indeed a problem disease for citrus; it can even kill the tree. However, the issue is not whether water occasionally comes into contact with the trunk, but how long water is allowed to stand against the trunk. Citrus experts say it's still a good idea to keep the area around the trunk as dry as possible. Be sure the watering well is further out from the trunk so that when you deep irrigate, the water doesn't stand against the trunk tissue).

Fruit must be removed from the tree before the next crop can develop.

FALSE (Fruit can be picked at anytime.)

Meyer lemon is illegal in Arizona.

Both TRUE and FALSE (Meyer lemon used to be illegal. However, in 2004, the Arizona Department of Agriculture ruled that Virus Indexed Improved Meyer from certified nurseries could come into the state. Non-certified Meyer is still forbidden. See Page 3 for details.)

An Orange A Day Keeps The Doctor Away

- Citrus fruit can be an important part of our diet. All citrus varieties are high in Vitamin C (ascorbic acid) and potassium while low in calories.
- Vitamin C helps to maintain capillaries, blood vessels, and teeth, aids in the absorption of iron, and acts as an antioxidant.
- Since our bodies do not store Vitamin C, we need foods high in ascorbic acid every day. The Recommended Daily Allowance (RDA) is 75 mg for men and 90 mg for women.
- The Food Guide Pyramid recommends that we have 2 to 3 servings of fruit everyday. One serving of citrus fruit would be a medium orange or tangerine, one half of a grapefruit, or 6 oz. of citrus juice.

	Calories	Potassium	Vitamin C
1/2 white grapefruit	38	177 mg	44 mg
1/2 pink grapefruit	46	181 mg	47 mg
6 oz fresh grapefruit	72	300 mg	71 mg
6 oz fresh orange juice	83	372 mg	93 mg
1 navel orange	65	250 mg	80 mg
1 valencia orange	59	217 mg	58 mg

Selection

When purchasing, look for fruit with fine-textured skin, free of signs of decay, damage, cuts or skin punctures, soft spots, or discoloration. Fruit should be heavy for its size. A shriveled or wilted appearance may indicate overly mature or injured fruit. Thickness of skin reflects weather conditions under which the fruit was grown, and is not an indication of fruit quality or juiciness.

Home Harvest

The time and length of the citrus harvest period will depend on the citrus variety, weather and growing conditions, and other factors. As a rule, however, all varieties of citrus will grow sweeter on the tree even after ripening. Eventually, the fruit will reach a peak of flavor after which it will begin to deteriorate. Warm summer temperatures will trigger softening of early fruit. When this occurs, harvest citrus promptly and preserve it as described below.

Home Storage

A week's supply of citrus can be kept at room temperature without significant quality loss. For longer storage of fresh fruit, keep unwrapped in a sturdy open carton or box in a cold room. Citrus stored in this way should keep for about 10 days to 3 weeks. Inspect fruit often, discard spoiled fruit and wipe off mold from sound fruit. Lemons keep best in the refrigerator where they will remain fresh for about 6 weeks.

Freeze Sections

Wash and peel fruit. A sharp knife or citrus peeler may be used. Separate sections. Using a thin-bladed knife, carefully slit the white membrane surrounding each section and lift out the fruit. Or, split the fruit in half across and scoop out sections with a spoon or knife. This procedure can be tedious if the membrane clings tenaciously to the fruit. Severely torn sections can always be used in marmalade. If left on, the membrane will impart a bitter taste to the fruit. Remove seeds. Pack sections into a freezer container in their own juice and freeze. Or, cover fruit with unsweetened grapefruit juice or water and freeze. If additional sweetness is desired, substitute a syrup made from 3 cups sugar and 1 quart water for the liquid.

If citrus is to be frozen for longer than 6 months, add 1/3 teaspoon powdered crystalline ascorbic acid to each quart of liquid used to cover fruit sections.

Freeze Juice

Ream juice, being careful not to press bitter oil from the rind. Pour into clean freezer containers (glass is best to prevent "off" flavors from developing). Seal and freeze.

Ice cube trays provide a convenient way to freeze juice. Once frozen, remove cubes from trays and store in freezer weight food storage bags. For juice that is to be frozen longer than six months, add 1/2 teaspoon ascorbic acid to each quart prior to freezing. (Orange juice may separate after thawing. This is caused by enzymes and is not reversible even in a blender.)

Freeze Lemon Peel

Remove the bitter white portion of the peel. Cut into strips or grind the yellow part fine, package, and freeze.

Canning Citrus Sections

Grapefruit is the only member of the citrus family that can be successfully canned at home. Other canned citrus becomes bitter and unpalatable.

Use thoroughly ripened fruit. Peel and separate sections from membrane as described above. Pack into standard canning jars. Cover with unsweetened grapefruit juice, water, or sweetened syrup (2 cups sugar and 4 cups water) to within 1/2 inch of jar top. Put on lid and screw band and tighten with finger tips. Process in boiling water bath 10 minutes for pints or quarts.



Homemade Treats Using Delicious Citrus

Candied Citrus Peel

- 5 - oranges
- 6 - lemons
- 2 - grapefruits
- 12 cups - cold water
- 2 cups - sugar
- 1/2 cup - honey
- 1 3/4 cups - boiling water

- Score the citrus in quarters and remove the peel.
- Cut peel into uniform strips about 3/8 inch wide to yield 3 cups of peel. (Save the peeled fruit for other uses.)
 - In a large saucepan, bring 6 cups of cold water and the peel to a boil; boil for 10 minutes. Drain and rinse.
 - Repeat process with 6 cups fresh water. In the same saucepan, bring to a boil 1 1/2 cups of the sugar, 1/2 cup honey, and boiling water, stirring to dissolve sugar.
 - Boil for 1 minute.
 - Add drained peel and simmer briskly for 40-45 minutes, stirring frequently to avoid sticking. Drain well.
 - In a large bowl, toss drained peel with remaining 1/2 cup sugar to coat well.
 - Spread on wax paper to dry. Store in a tightly covered container. Makes 1 pound.

Recipe by Sunkist ®

Spiced Citrus Peel

For a spiced citrus peel, combine a small amount of cloves or cinnamon, wrap in a cloth bag and secure the bag at the top with a tie. Add to syrup during cooking of peel. For a minted peel, add a few drops of mint flavoring to the syrup base before cooking the peel.

Chocolate Covered Candied Citrus Peel

In the top of a double boiler, over hot, not boiling, water, melt the chocolate (6 oz. sweet or white sweet chocolate); stir occasionally. Dip each piece of Candied Citrus Peel (1 lb.) from the previous recipe in the chocolate covering 1/2 to 2/3 of each piece only; gently shake off any excess chocolate. Cool on wax paper until chocolate is set.

Recipe by Sunkist ®

Citrus Pomander

Press whole cloves into the skins of fresh, whole lemons, oranges, and limes. The volatile oils in the citrus skin mix with the cloves to create an unforgettable fragrance.



Citrus Gleaning

Don't let excess citrus on your trees go to waste. Harvest it and donate to a foodbank to feed the hungry. Another option is to organize friends and neighbors or join a "gleaning group" when citrus trees are loaded with fruit. Volunteers pick fruit from trees "donated" by owners who don't have the time or ability to harvest the fruit. Check with local foodbanks in your area to see if they sponsor such activities. This website offers info for the Phoenix area :

<http://www.firstfoodbank.org/events/citrus>

Deciduous Fruit and Nuts

For optimum fruit production in the low desert, choose deciduous fruit tree varieties that have low “chilling requirements”, have early maturing fruit, and are self pollinating.

1) Most deciduous fruit and nut trees from temperate climates require a genetically determined amount of cold weather (chill hours) to set fruit. While there is still some disagreement in the scientific community around how to precisely calculate chill hours, a good rule of thumb is to count the number of hours between November 1st and February 15th that are between 32° and 45° F. These hours are cumulative and need not be continuous. The most benefit is derived from chilling hours occurring in December and January. Daytime temperatures above 60° F during this period may negatively affect the cumulative total. Most areas of Maricopa County average between 300 to 400 chilling hours per year. By selecting varieties of fruit that require around 250 hours of chilling to set fruit you can be sure of a full crop almost every year.

2) Select varieties which mature before the hot summer temperatures to avoid sunburning fruit.

3) If space is a consideration, choose a self-fruitful/self pollinating variety. Many deciduous fruit trees require cross pollination to bear fruit. Thus, it is necessary to have two varieties of the same type of fruit in order for either tree to bear abundant fruit. A self pollinating variety will have good fruit set even with only one tree.

The rootstock on to which a fruit tree is grafted can impact the tree in a variety of ways:

A) Provide disease resistance or tolerance for pathogens such as Root-Knot Nematodes, Oak Root Fungus, and Phytophthora;

B) Improve performance in a particular

soil type, i. e. some rootstocks perform well in clay soils, others in sandy soils;

C) Control growth rate and mature size;

D) Increase drought tolerance;

E) Increase salt tolerance; and

F) Modify fruit quality including taste, texture, size and yield.

Your local nursery should offer fruit trees that are grafted on to appropriate rootstocks for your area.

The following is a list of low-chill deciduous fruit trees which should do well in the low desert and are available at local nurseries. This is not an all inclusive list and many of these varieties are still untested in the low desert of Arizona. In addition, many new varieties are developed every year. Use the three criteria identified above when selecting fruit trees for your yard.

Varieties which have been evaluated and performed well in the Salt River Valley

Apples

Anna is a remarkable fruit for mild-winter climates in Southern Arizona. Heavy crops of sweet, crisp, flavorful apples even in low desert. Fresh or cooked. Keeps 2 months in refrigerator. Chilling requirement 200 hours. Self-fruitful or pollinated by Dorsett Golden or Ein shemer.

Beverly Hills produces a pale yellow medium sized fruit. Chilling requirement 300 hours. Self fruitful.

Ein shemer is heavy-bearing, with very low chilling requirement of 100 hours. Sweet yellow apples in early summer (June in the low desert). Excellent pollenizer for Anna. Self- fruitful.

Fuji from Japan, has quickly become California’s favorite apple. Sweet, very crisp and flavorful, excellent keeper. Dull reddish-orange skin, sometimes russeted. Chilling requirement listed as 600 hours but preliminary testing in the

low desert indicate that it may be less. Self-fruitful.

Gala is a wonderful dessert apple from New Zealand. Crisp, nice blend of sweetness and tartness, rich flavor. Skin reddish-orange over yellow. Chilling requirement listed as 500-600 hours, preliminary testings suggest it maybe less. Self-fruitful.

Golden Dorsett is an outstanding sweet apple for warm winter areas. Firm, very flavorful, sweet like Golden Delicious. Productive throughout the low desert. Good early season sweet apple. Chilling requirement of 100 hours. Self-fruitful.

Gordon produces a reddish-green fruit for fresh use and cooking Chilling Requirement 400 hours. Self-fruitful.

Apricots

Castlebrite has good flavor when fully ripe, otherwise somewhat tart. Good size. Bright orange with red blush. Firm and juicy. 450 chill hours. Self Fruitful.

Gold Kist is an excellent backyard apricot for warm winter climates. Freestone, very good quality. Heavy bearing. Early harvest, late May to early June. Requires 300 chill hours. Self-fruitful.

Katy is a large, all purpose flavorful freestone. Tree ripe fruit is subacid (not tart). A favorite apricot for warm-winter Climates. Early harvest, late May to early June. Requires 400 chill hours. Self-fruitful.

Modesto is commercially grown for shipping. 300-400 hours chilling. Self Fruitful.

Patterson is a vigorous tree. Fruit are medium to large in size with good firm, modestly flavorful flesh. Requires 500 chill hours

SELECTING FRUIT AND NUT VARIETIES

Royal Rosa is extremely vigorous - more disease tolerant than other apricots. Bears young and heavy. Especially nice fruit: sweet, low acid, fine flavor. Very early harvest (early-to-mid May) Excellent backyard apricot. Requires 500 chill hours. Self-fruitful.

Figs

Black Mission is popular and flavorful for eating fresh or dried. Medium to large pear shaped fruit has skin which is black-purple and strawberry colored flesh. Tree is large and long lived. Well adapted to elevations below 2,000 feet.

Brown Turkey is sweet tasting and best eaten fresh. Bell shaped medium to large fruit has brownish-purple skin with pink flesh. Tree is large and best adapted to 2,000 - 3,000 feet. Not as prolific as Mission.

Conadria (White) is mild and sweet with whitish-pink flesh. Large fruit with cream to light green colored skin. Good eaten fresh or dried. Tolerates heat well.

White Kadota is good fresh or dried, suitable for canning. Fruit is medium sized with yellow skin. Flesh is amber with few seeds. Hot weather aids in ripening

Peaches

Bonanza Miniature is a popular yellow freestone. Large fruit is sweet, low in acid, with a mild, refreshing flavor. Mid-to-late May in low desert climates. Five-to six-foot tree. Chilling requirement very low, 250 hours or less. Self-fruitful.

August Pride is a large, all-purpose yellow freestone for mild-winter climates. Sweet, aromatic, rich flavor, one of the best. Chilling requirement less than 300 hours. Self-fruitful.

Babcock is a long-time favorite white-fleshed freestone. Sweet and juicy, aromatic, low in acid. Very high-scoring in taste test. Chilling requirement of 250-300 hours. Self-fruitful.

Desert Gold is very early ripening: mid-May in Arizona. Tree-ripened fruit has good flavor and sweetness for such an early variety. Yellow Clingstone. Heavy bearing. Chilling requirement of 250 hours. Self-fruitful.

Desert Red has an excellent quality, firm cling peach that has good color. Produces large fruit when thinned and girdled. Chilling requirement of 200-300 hours. Self-fruitful.

Earligrande is medium size, low-chill peach from Gulf Coast Texas. Yellow semi-freestone. Very early (May). Successful in Arizona and similar climates. Chilling requirement of 275 hours. Self-fruitful.

Eva's Pride is a delicious, fine-flavored peach with very low-chilling requirement. Medium- to large-sized yellow freestone. Ripens early-to-late May. Chilling requirement of 100-200 hours. Self-fruitful.

Floridaking is a high quality early season peach. Large, firm, flavorful semi-freestone, very sweet when fully ripe. Mid-May in warm winter climates. Chilling requirement 450 hours or less. Self-fruitful.

Floridaprince is from Florida, successfully grown in Arizona. Larger fruit than Desert Gold, more tolerant of desert heat. Ripens late April to early May in Arizona. Very good quality when tree-ripe. Chilling requirement of 150 hours. Self-fruitful.

Floridagrande is an excellent yellow fleshed semi-freestone peach. Flesh will have some red coloration at maturity. Requires less than 100 chill hours.

May Pride is a very early-ripening peach for warm winter climates. Ripens in May with Desert Gold. Delicious, sweet and tangy fruit. Very large for such an early peach. Large, showy pink blossoms. Chilling requirement 175 - 200 hours. Self-fruitful.

Mid-Pride is the best yellow freestone for warm winter climates. Mid-season peach. Chilling requirement of 250 hours. Self-fruitful.

Tropic Beauty is an excellent quality yellow flesh, firm freestone peach. Produces a large fruit when thinned and girdled properly. Chilling requirement of 100-200 hours. Good for the low desert. Self-fruitful. Ripens early May.

Tropic Snow is a medium-sized fruit. Skin is white with red blush. White sweet flesh. Good flavor. Freestone. Ripens early May. Chilling requirement 175-200 hours. Self-fruitful.

Tropic Sweet is a good quality freestone, yellow-fleshed peach. Fruit are very large when thinned and girdled properly. Ripens just after Tropic Beauty. Chilling requirement of 100-200 hours. Self-fruitful. Ripens mid-May.

Vallegrande is an excellent quality, semi-freestone, yellow-fleshed peach. Flesh is firm and ripens to 60% blush at maturity. Flesh becomes red as fruit matures. Chilling requirement of 100-200 hours. Self-fruitful. Ripens early May.

Pears

Floridahome has very nice quality: sweet, smooth-textured, juicy, flavorful. Early bloom. Chilling requirement less than 400 hours. Partly self-fruitful.

Kieffer is a medium to large late season fruit. Canning/cooking. Sprightly flavor, coarse texture. Resists fireblight, tolerates hot climates. Dependable crops. 350 hours. Self-fruitful.

SELECTING FRUIT AND NUT VARIETIES

Asian Pears

Shinseiki is juicy, sweet, refreshing, and crisp like an apple. Easy to grow. Keeps well. Harvest June in the desert. Bright yellow skin. Vigorous, heavy bearing. Chilling requirement of 350-400 hours. Self-fruitful.

Yakumo has a slight tapered neck, instead of round shape of other Japanese pears. Harvest early, before Shinseiki. Very nice quality - sweet, juicy, refreshing. Crisp like apple when ripe. Chilling requirement of 450 hours. Pollenizer required.

Persimmons

Fuyu (Jiro) ("Apple Persimmon") is medium size, flat shape, still hard when ripe, non-astringent. Cool or hot climate. Hardy, attractive tree, practically pest free. Chilling requirement 200 hours. Self-fruitful.

Giant Fuyu is larger, not so flat as Fuyu. Crunchy when ripe. Sweet, flavorful, non-astringent. Easy to grow, cool or hot climates. Chilling requirement of 200 hours. Self-fruitful.

Izu is very sweet, tasty, non-astringent. Fruit ripen about three weeks before Fuyu. Medium to large size, round shape. Relatively small tree, good choice for backyard persimmon. Sometimes difficult to start from bareroot. Chilling requirement of 100 hours. Self-fruitful.

Plums

Beauty is a sweet, flavorful plum. Red over yellow skin, amber flesh streaked red. Chilling requirement of 250 hours. Self-fruitful.

Gulf Gold is a green skinned plum which turns yellowish when ripe. Juicy, sweet, yellow flesh. Chilling requirement of 250 hours. Self-fruitful.

Gulf Ruby is a sweet, juicy plum, with reddish-purple skin and amber flesh. Chilling requirement of 250 hours. Self-fruitful.

Methley is juicy, sweet, red flesh, mild flavor. Reddish purple skin. Attractive tree, heavy bearing and vigorous. Chilling requirement of 250 hours. Self-fruitful.

Santa Rosa is the most popular plum in California and Arizona. Juicy, tangy, flavorful. Reddish-purple skin, amber flesh tinged red. Chilling requirement of 300 hours. Self-fruitful.

Quince

Orange Quince is large and round with bright yellow fruits that often exceed 1lb. Flavorful, aromatic, used for cooking. Early harvest. Old variety. Cold hardy, yet low chilling requirement of 300 hours. Self-fruitful.

Pineapple Quince has heavy crops of large, tart fruit used in baking, jams, and jellies. Profuse, ornamental bloom. Cold hardy, yet low chilling requirement of 300 hours. Self-fruitful.

Almonds

All-in-One (semi dwarfing) is medium to large. Soft shelled with good quality sweet kernels. Classified semi-dwarf to 15 feet. Chilling requirement of 500 hours (may not be suited for Salt River Valley). Self-fruitful. Number 1 almond for home orchards.

Garden Prince Genetic Dwarf is compact, lushly foliated 10-12 foot tree. Soft shell, kernels especially sweet and tasty. Bears young and heavy. Chilling requirement of 250 hours. Self-fruitful.

Neplus Ultra is a large soft-shelled nut with a long broad flat kernel. Chilling requirement of 250 hours. Needs pollenizer. Best pollenizer: Nonpareil.

Nonpareil Almond is the number 1 commercial almond, the standard of quality. Interfruitful with All-In-One and Neplus. Chilling requirement 400 hours. Pollenizer required.

Pecans

Cheyenne bears heavy and early. Nuts are medium size, soft shell, with excellent kernel quality. Tree is somewhat susceptible to limb breakage, slow growing tree.

Choctaw is vigorous and is an excellent producer. Moderately precocious. Produces pecans of outstanding quality. Shells are thin and cracks into half kernels very easily.

Comanche has medium to large sized nuts, nearly round, thin shelled. Good producer, nut quality is excellent. Nuts tend to sprout.

Sioux is a good producer with small to medium size nuts with outstanding kernel quality. A little slow to begin producing moderately precocious.

Western Schley (Western) is easy to grow. Nut long, tapered medium sized, thin-shelled, good kernel quality. Self-fruitful. Early bearing 4 to 5 years. Recommended for single tree planting in home garden. Less affected by zinc deficiency than other cultivars. Precocious and prolific. Tendency for nuts to sprout (pregerm) in the low desert.

Wichita has highly flavored, medium to large size nuts. Well-filled, soft shell. Lump, rich, distinctively flavored kernel. Bears heavy at young age. Pollinators are Cheyenne or Western Schley. Prone to zinc deficiency. Strong tendency for nuts to sprout (pregerm) in the low desert.

SELECTING FRUIT AND NUT VARIETIES

Grapes

Cardinal has clusters large to medium in size. Very large, seeded, cherry red berries become reddish black with maturity. Use for arbor or summer house. Spur pruned.

Exotic has black, large, seeded, crisp and sweet berries. Berries are irregular to oval in shape in large clusters. Ripen in July. Spur pruned.

Fantasy has large, black, seedless berry used for table or raisin. Excellent flavor. Ripens in July. Cane pruned.

Flame seedless is a light red, seedless, crisp, sweet berry. Cool nights are required for full color development. Ripens June - July. Spur pruned.

Perlette is a pale green, round, crisp, juicy seedless medium-sized berry. Larger than Thompson, unique flavor - mild aromatic in flavor. Spur pruned, ripens in June.

Ruby seedless is dark red, sweet, crisp, excellent fresh or raisin. Ripens after Thompson seedless. Chilling requirement of 100 hours, self-fruitful. Ripens in June. Spur pruned.

Thompson seedless is the most popular grape. Green, seedless berry, white grape for fresh or raisin. Very sweet. Self-fruitful. Chilling requirement of 100 hours. Ripens mid June - July. Cane pruned.

Blackberries

Brazos is a very vigorous, thorny, erect plant which produces an abundance of large high quality berries. Berries are large, attractive appearance and heavy yields, tart acid flavor.

Rosborough is vigorous with moderately upright canes which produces well in a wide variety of soil and climatic conditions. Fruit are large, attractive in appearance and have a sweeter flavor than Brazos.

Strawberries

Camerosa is large and vigorous. Fruit are large, firm wedge shaped berries of good quality.

Chandler is large and vigorous. Produces nice berries which are smaller than Camerosa, but tend to be sweeter.

Sequoia is a big vigorous plant. Fruit are large, wedge shaped of high quality but soft when ripe.

Tioga is very large and vigorous with big, dark green glossy leaves. Fruit are very large, firm wedge shaped berries of medium quality.

Kiwi

Tomari Male is the pollenizer for Vincent Female. Does not bear fruit. One male can pollinate up to eight Vincent females.

Vincent Female has a low chilling required, which is adapted to Southern California. Tasty, well-regarded fuzzy skinned fruit. Pollinated by Tomari male.

Pomegranates

Pomegranates are borne on a large shrubby plant sporting bright shiny leaves, large orange/red blooms and an abundance of fruits. Pomegranates are well suited to desert regions and require little if any care beyond watering and fertilizing. Prune only to shape the shrub and in 10 to 15 years it can become a small tree. Choose a named variety to ensure quality fruits. Varieties that do well in the low desert include Wonderful, Utah Sweet and Yellow Papershell. The few potential problems include some fruit splitting caused by irregular watering and some years the Leaf-Footed Plant Bug can cause small rotted pockets some in individual fruits. There is no effective control for the Leaf-Footed Plant Bug.

Selecting Fruit Trees at a Glance

Select deciduous fruit tree varieties that:

1. Require less than 400 hours chilling.
2. Produce early maturing fruit.
3. Are self pollinating (if space is a premium).

Terms From A to Z

ALBEDO. The white portion of citrus peel. It contains nutrients, such as vitamins, fiber, and pectin.

CITRUS. This word is derived from the Greek word, *kedros*, which means "cedar." When they first appeared in Greece, citrus trees were thought to be a type of cedar tree

FREESTONE. A fruit, especially a peach, that has a stone that does not adhere to the pulp.

PECTIN. A carbohydrate naturally found in fruits. It forms a gel when combined with the right amount of sugar and acid. The white portion of citrus is high in pectin, as are apples, grapes, and some plums.

ZEST. The colored outer rind of citrus. Tiny pockets of volatile oils create intense flavor. When a recipe calls for zest, use only the colored portion of the peel because albedo can be bitter. Peel or rind refers to the entire skin, including the zest and albedo.

(For more details see University of Arizona Cooperative Extension publication AZ 1269 *Deciduous Fruit & Nuts for the Low Desert* by Lucy K. Bradley and Michael Maurer.)

BLACKBERRIES

Varieties

Rosborough', 'Womack', and 'Brisson' are varieties suitable for growing at home. 'Rosborough' has been the heaviest producer.

Planting Time

Berry plants may be planted from late January through March. Root cuttings (pieces) or rooted cuttings are both successful.

Soil Type

Any well-drained soil will do. Amendments are OK, but not necessary.

Spacing

Plant three to four feet apart within a row, and eight to ten feet between rows.

Irrigation

Berry plants should be well-watered when set out. If plants are irrigated with a hose or a bubbler head, water every three to seven days for the first two months, depending on temperature. When established, they can be watered in this way every one to two weeks. If drip or mini-sprinkler irrigation is used, apply one to two inches of water per week, irrigating every day when the plants are young, and every one to two days once the plants are established. Irrigate more frequently during dry, hot weather, when plants are flowering and when fruit is ripening.

Fertilizing

About one month after planting, sprinkle ½ to ⅓ cup of 13-13-13 or 10-10-10 fertilizer in a 2-foot circle around each plant, and in June or July, reapply the same amount of fertilizer in a 2½- to 3-foot circle. The succeeding years, apply 1 cup in a 3-foot circle in early March and again in late July.

Trellising

The canes are semi-erect, so trellising is not needed.

Pruning

Blackberry canes are biennial. Canes are fruitless the first year, bear fruit the second year, and die after fruiting. In June following harvest, all fruiting canes (floricanes) should be removed, leaving only the leafy vegetative or primacanes. New primacanes produced in the second and subsequent years will be erect and should also be cut to a height of 3 to 4 feet in June to encourage lateral branching. Remove only the top 2 to 3 inches of each cane, because more severe tipping wastes growth and produces weaker laterals. Vigorous plants may require topping 2 to 4 times.

Propagation

Plants may send up shoots from the roots. These may be dug and replanted.

Diseases, Insects and Birds

Blackberries have few disease or insect problems, except for occasional mites. Birds may be a problem in some areas, so netting should be considered. Fruit may also become sunburned late in the harvest season. Shading may help reduce sunburn.

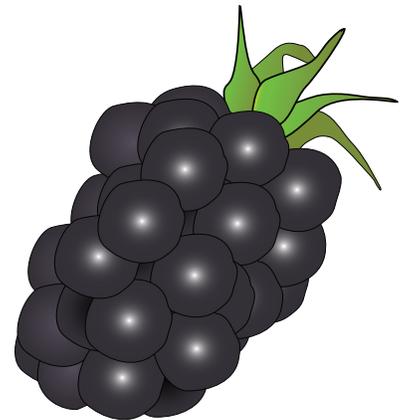
Yield

Plants will produce 3 to 10 pounds of fruit per plant beginning at age three. Fruit should ripen beginning in early May, and continue for 3 to 4 weeks. Fruit is sweetest when "dull black".

Freezing Blackberries

Berries are a very perishable fresh product. You can freeze them by placing them on a tray in a single layer, not touching. Freeze for approximately 3 hours or until firm to touch. Once they are frozen, place them into an airtight container and freeze for up to 3 months. Frozen berries are best used for cooking.

(For more details see University of Arizona Cooperative Extension publication AZ 1269 *Deciduous Fruit & Nuts for the Low Desert* by Lucy K. Bradley and Michael Maurer.)



Each small unit in a blackberry is called a drupelet.

PLANTING

Although some varieties of deciduous fruit trees come in containers, a large selection is available during the bare-root season in January and early February. All varieties require good subsoil drainage. Any “caliche” or hard pan should be shattered and amended to permit salt leaching and normal root development. Even under good soil conditions, the planting hole should be no deeper and 5 times wider than the tree root system. Sand is a useful additive in soils that drain poorly. No manure should be put in the planting hole, but a few pounds (16 to 20) of balanced fertilizer such as ammonium phosphate may be thoroughly mixed with the backfill material to ensure adequate phosphate and a “starter” supply of nitrogen. “Pills” of fertilizer that release nutrients slowly also are available and safe to use at planting time. If Texas (Cotton) Root Rot fungus has been identified on other plants in the area, soil preparation is needed. Contact your local Cooperative Extension Service Office.

Water thoroughly at planting time and on a weekly basis through the first season after new growth begins. The young tree should be cut back to a trunk height of 18 to 36 inches at planting time. This height will determine scaffold limb formulation. Where lawn maintenance activity is not required around the base of the tree, lower scaffold limbs will facilitate easier fruit picking, pruning and tree care. In yards where flood irrigation is not available, a watering basin should be kept around the tree and expanded in size as the tree roots grow. Bermuda grass should be controlled to allow maximum root development. Any exposed bark should be protected from sunburn with whitewash or water-based white paint. Place a cardboard or newspaper wrap around the trunk to prevent mechanical injury.

Pruning newly-planted deciduous fruit trees is one of the most important steps in

developing trees with strong framework branches. Selection and arrangement of these branches determine the type of development and growth in later years.

For peaches, nectarines, almonds, apricots and plums, choose trees with side branches. This permits the selection of the main framework branches after planting rather than waiting one growing season for them to develop side branches.

After planting the tree, measure from the ground level to a height of 24 to 30 inches on the main trunk and cut at this point. Next, select the framework branches below the pruning cut. The framework branches should be selected with care; they will support the weight of growth that forms in the future. Select at least three and not more than five that are alternately spaced (spiral-like arrangement) and remove all others. The selected framework branches should be cut back to short stubs measuring 4 to 6 inches. This type of pruning will produce a tree with a vase-shape arrangement of limbs.

Apples, pears and cherry trees are pruned differently than vase-shaped trees; they will be pruned to a central or modified central-leader type of growth. Selection of framework branches is done on the same basis as the vase-shaped trees; select three to five alternately spaced limbs. Before doing any pruning, observe the following recommendations:

1. Measure from the ground level to a height of 24 to 30 inches on the main trunk.
2. Mark this area with a piece of string and select the three to five framework branches below this marking.
3. Other than the framework branches, remove all side limbs above and below the string marking.
4. Measure approximately 2 ft above the topmost framework branch and cut the main trunk at this point.
5. Cut the selected framework branches to a length of 4 to 6 inches.

Vase-Shaped Arrangement

Used for peaches, nectarines, almonds, apricots and plums.

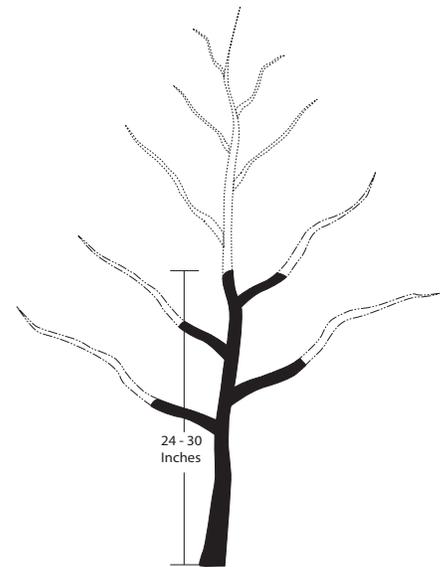


Figure No. 1

Cut main trunk at the measured level and cut the side branches to short stubs measuring 4 to 6 inches in length. Dotted lines indicate removed limbs.

Central Leader Arrangement

Used for apples, pears, and cherries.

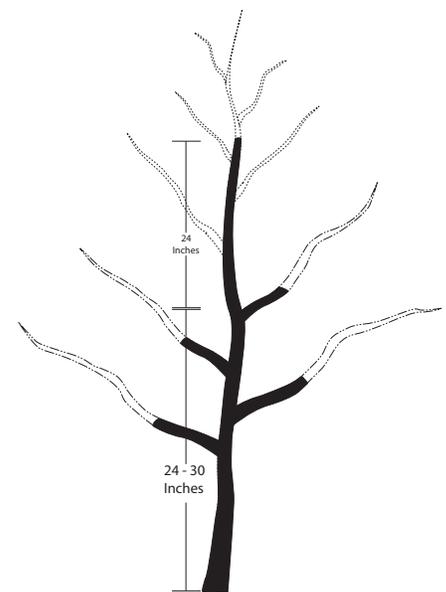


Figure No. 2

Leave approximately a 2 foot portion of the main trunk above the 24 - 30 inch level. Dotted lines indicate removed limbs.

IRRIGATING AND FERTILIZING

IRRIGATING

Young trees need watering weekly in medium to heavy textured soils and twice weekly in sandy soils after leaf growth has started and throughout the summer months. As trees age, watering intervals can be lengthened but with more water applied per application. Four to six inches should be applied at each irrigation as the trees reach bearing age.

Irrigation intervals can be lengthened after fruit maturity and sharply reduced during the fall months. In dry winters, one watering may be applied in early January. Salt burn and tree defoliation may result if sprinkler water is allowed to contact tree foliage. Evaporative cooler drain water should not be used. Drip or trickle irrigation on deciduous fruit is practical.

FERTILIZING

Nitrogen in some form is the major element required to grow deciduous trees and fruit. It can be supplied in the form of ammonium sulfate or any balanced fertilizer. Manure can be used as a nutrient on deciduous fruit but should be applied only during the winter dormant season. Control of Bermuda grass around the base of the young tree will result in better response to fertilizer. A few spoonfuls of fertilizer will be needed two or three times during the second growing season and gradually increased with tree age. From ½ to one pound of actual nitrogen per tree per season should be enough for bearing-age trees if surrounding grass is adequately fertilized. To get the number of pounds of any fertilizer needed to supply one pound of actual nitrogen, divide the percentage of nitrogen of that fertilizer into 100. Example: 5 lbs. of a 20% nitrogen material will give 1 lb. of actual nitrogen.

Apply most of the fertilizer for deciduous fruit before bud break in the winter or early spring, with a light application in sandy soil after fruit thinning. When applying nitrogen fertilizer, broadcast the recommended amount within the area from the trunk to the outer branch area and deeply water into the soil. Composted manure may be used for the organic benefits, and does supply

a portion of the nitrogen requirement and enough phosphate for normal growth where phosphate deficiencies have been identified. Some varieties, particularly peaches, are susceptible to iron deficiency, indicated by yellow leaves with green veins. Where possible, reduce the frequency of watering and apply chelated iron compounds to correct the condition.

TOP 10 REASONS TO BECOME A MASTER GARDENER

1. Attend 17 weeks of certification training. Be garden smart!
2. Learn from the experts. Classes taught by University of Arizona educators and local experts.
3. Receive great gardening books and publications specific to gardening in the low desert.
4. Contribute to your community by sharing information with the public.
5. Use water resources wisely: learn how to utilize desert-adapted plants.
6. Get the most from two growing seasons in our low desert.
7. Discover how to plant in desert soils, diagnose plant problems, and propagate plants.
8. Make new friends during plant and seed exchanges.
9. Develop skills in new areas such as public speaking and computer use.
10. Make the world a more beautiful place while saving water and resources.

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<http://extension.arizona.edu/maricopamg>

Fig trees are wide spreading, vigorous growers in southern Arizona. They are good producing trees with dense, heavy summer foliage.

Fig trees bear fruit* under different pruning methods. At least two distinct crops are produced each year. The first is produced on the previous year's branches and matures about June. The second crop is borne on the current season's growth from late June through October. The first crop is normally larger and juicier than the second crop. Annual pruning should be done in January when trees are dormant. When this pruning is severe, the first crop can be expected to be lighter, but the second fruiting has better quality and size. Heavy, yearly pruning helps keep trees shorter and easier to pick but will naturally reduce fruiting potential. Even then, a good yield can be expected.

Fig trees are normally pruned to a vase-shape frame. After transplanting, cut them back to approximately 2 ½ ft. above the ground to induce low branching. The next winter, select three or four branches to become the main limbs and top them about 4 ft. above the ground. Remove all other limbs. In future years, the annual dormant pruning should also include removing weak and undesirable branching, thinning, balancing and cutting back if you wish to control the height and width of trees.

Although fig trees are more tolerant of neglect than most other fruit trees, regular irrigations help ensure good crops. Allow water to soak deeply into the soil each time. Usually, the simplest method for yard trees is to dig a basin, 6 to 8 inches deep, under the entire branch spread of each tree. Fill this with water at each irrigation. This usually will soak deeply enough to supply the total root zone. Or, continuously apply water at a rate the soil will absorb it to the

total area under their branch spread for about ½- day each time. Our irrigation frequency needs vary with the type of soil and weather. In the summer, irrigate mature fig trees every 10 to 14 days in our average soils. About ⅓ that often should be adequate during the winter. For newly planted figs, irrigate them every 5 - 7 days during the summer and every 10 - 14 days during the winter.

Fertilizing with nitrogen regularly is needed for good growth. Other fertility elements are generally sufficient in local soils or are supplied through organic matter breakdown. Mature trees, those 5 years old or older, need 1 - 2 lbs. of actual nitrogen per year which amounts to 5 - 10 lbs. of ammonium sulfate (21-0-0 or comparable fertilizer; 1 lb. of 21-0-0 equals 2 cupfuls.)

Give mature trees about half the total amount in late January. Then, the remainder about May. Apply the fertilizer in the outer area of the irrigation well or basin where the feeder roots are located. For younger fig trees, use proportionately smaller amounts. The first year, don't fertilize until 4 inches of new growth has developed, then, 2 - 4 tablespoons per tree every 6 weeks through late September. Do not fertilize more than four times. In the second year, apply two cupfuls in January and May. Each successive year, add a total of one additional cup per year until the fifth year, then handle as a mature fruit tree.

Fruit drop may result from insufficient irrigation or loss of tree vigor. Figs that develop at tips late in the season are often dry, or drop because of cool weather. Nematodes are microscopic worms that infest roots and weaken tree growth. Premature leaf shed and poor fruit development are typical symptoms and small swollen knots on feeder roots confirm their presence. They are more common in sandy soil. If nematodes are severe and tree growth is poor despite

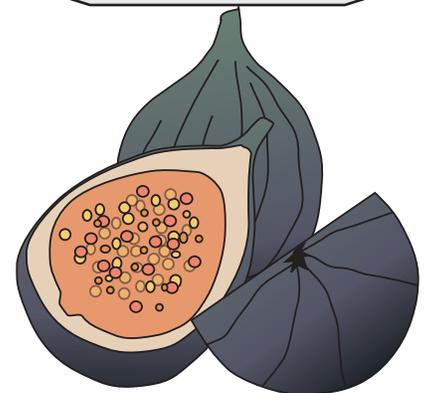
good care, it may be necessary to remove the trees and fumigate the soil for control. Fig trees are susceptible to Texas Root Rot. Nearly ripe figs may split due to adverse weather conditions, or following irrigation of soil that became too dry. Split figs rapidly spoil and attract insects. Souring is caused by sour fruit beetles entering the "eye" (blossom-end opening) infecting the inside of fruits with bacteria and yeasts. Figs with very small eyes, such as the 'Mission' or 'Conadria' varieties, tend to exclude more insects than varieties with large eyes, such as 'Brown Turkey'. Harvest daily and promptly discard all spoiled fruit to minimize attracting insects for quality fruit.

Fresh figs are best when fully ripe. You can determine this by bending the fruitneck. To reduce spoilage, remove the fruit with the stem attached. Gloves are recommended for those who find the milky fig juice irritating to their skin.

(For more details see University of Arizona Cooperative Extension publications MC 23 *Home Grown Figs* by Allen D. Boettcher)

***Not a Fruit!**

Technically what is eaten of the fig is not botanically the fruit. It is the flower tissue. The botanical fruit would be crunchy seeds. The word "fruit" is used only for ease of writing.



PECAN TREES

Pecan trees, if properly grown, are well adapted for landscape purposes throughout Southern Arizona, but spring frosts may be a hazard to successful nut production at 3,500 ft. elevations or higher. Winter temperatures in the 0° range will also be limiting to tree survival at higher elevations. Variety selection should be made carefully, particularly if nut production is one of the objectives.

All varieties will require cross-pollination if higher production and kernel quality is desired. Some nut production may occur as early as the third growing season but the fifth season is more typical. Pecan trees are long-lived and should live 40 years or more with proper care.

Pecan trees, by growth habit, are large stately trees that need 30 ft. distance from adjacent trees or buildings for maximum growth. They are adapted to winter pruning to maintain smaller tree size but the following year's nut crop will be reduced. Pecans are not recommended for planting under electric or telephone lines. Honeydew from uncontrolled aphid populations is a serious problem when pecans are planted overhanging driveways or sidewalks.

Young pecan trees should be planted during the December to February period as bareroot specimens. Since pecans by habit are deep rooted, soils should be well drained with no restricting caliche or hardpan layers. The planting hole should be dug somewhat deeper than the tap root of the young tree and backfilled. In addition to a strong, well-developed tap root, good lateral roots are necessary for adequate growth of the tree. No commercial fertilizer should be mixed with the backfill soil but the addition of peat moss or wood by-product organic materials are beneficial. A basin should be formed around the young tree to facilitate watering where flood irrigation is not available. The root

system should not be allowed to dry out from the time of purchase until planting is completed. After a thorough soaking of the planting basin is completed, an organic mulch applied to the tree basin will help conserve moisture and provide partial weed control. Every effort should be made to maintain the area around the young trees Bermuda grass-free for the first 2 or 3 growing seasons. Only contact weed sprays should be used.

At planting time, the training of the young tree should begin. The "whip" or existing trunk may be cut back to 4 ft. to develop a lower head on the tree. If the tree has existing side branches from the main trunk, and is not cut back, any of these limbs with an angle closer than 45° to the main trunk should be removed. The remaining laterals should be cut back to 6 inches in length. Cut just above a bud when heading these shoots back to avoid stubs. Any shoots below the 3 or 4 laterals selected as main scaffolds should be removed. The trunk of the young tree should be protected from sunburn with cardboard or water-based white paint.

As the pecan tree reaches maturity, a strong central header (limb) should be allowed to develop along with well-spaced scaffold branches. Tree size can be limited to a certain extent by cutting back to the first strong lateral branch during January. Some reduction in nut crop will result from this annual pruning but the tree will be less susceptible to major limb breakage from high winds.

The watering schedule for pecans will vary depending on elevation, soil type, use of mulch, etc. The objective of the application of water should be to supply deep sub-soil moisture only as frequently as necessary to maintain tree and/or nut growth. A 7 to 10 day summer schedule should be adequate during the first one or two years and gradually lengthened to 14 to 20 days as the tree reaches nut-bearing age. On trees where

a nut crop is present, consistent deep waterings in August and September will help to insure maximum nut filling. An irrigation applied after the pecans are mature in the fall will be sufficient for the winter months. Apply a slow, deep soaking in the spring as bud swelling is noticeable and gradually increase the frequency with higher temperatures. At no time should water from sprinkler systems be allowed to contact the leaves of pecans. Severe salt burn may result from this practice if water quality is marginal.

The two elements needed for pecan tree growth in southern Arizona are nitrogen and zinc. Nitrogen can easily be supplied from ammonium sulfate (21% N) or a balanced fertilizer containing equivalent amounts of nitrogen. Trees starting their second season should receive ½ cup of ammonium sulfate, or equivalent, on 4 to 6 week intervals for three feedings. This amount should be gradually increased to 1 lb. of ammonium sulfate, or equivalent, per inch of trunk diameter as the tree reaches bearing age. This total amount should be applied in at least two applications in the spring and early summer. The area of fertilizer application should extend from the trunk to the dripline of the tree. No fall fertilization is recommended. If the tree is growing in a Bermuda grass lawn area, slightly higher amounts of fertilizer may be needed to maintain 8" to 16" of new shoot growth annually. Apply a deep watering with any fertilizer application.

Zinc needs in pecan are critical and are much more likely to limit nut production than nitrogen. Certain varieties such as the Wichita are highly susceptible to zinc deficiency which causes smaller than normal leaves, yellowing and bunching (rosette) of young leaves and browning of older leaves. Zinc can be supplied to pecan trees in the form of zinc sulphate, applied in holes or a trench at the tree dripline, at the rate of 1 lb. per inch of

trunk diameter. More efficient response to zinc can be obtained by mixing 1 oz. (1 tbs.) of zinc sulphate per gallon of water and apply as a thorough coverage leaf spray at bud break and repeat twice as leaves expand up to 1" in length.

In the fall as temperatures drop, the pecan husks will lose their green color and split open. While pecans can be harvested as soon as the husks split, the shell and nutmeat will be easier to separate if some additional drying is allowed on the tree or by spreading the nuts on wire mesh or metal trays for 3 or 4 days in the sun. Pecans in shell or meats should be frozen if they are stored for 6 months or more. For more immediate use, airtight containers at refrigerator temperatures will preserve good quality in nutmeats. Pecans in shell can be more successfully stored for long periods.

Pecans are subject to aphid infestations which may detract from the appearance of the tree, result in lighter nut crops and become a serious nuisance factor when overhanging sidewalks or driveways. When available, systemic insecticides applied to the tree root area in the spring or early summer provide excellent aphid control at minimum cost. Read label restrictions carefully when applying systemic insecticides. Aphids can be controlled with contact insecticides if equipment is available to provide full tree coverage. Apply contact insecticides as soon as the "honeydew" effect on pecan leaves is readily noticeable.

Stink bugs are a problem on pecans in terms of nut quality. The piercing type injury caused by stink bugs early in the season results in a softening or rotting condition of the nutmeats at harvest time. Due to the erratic nature of stink bugs' flights and feeding, effective control is difficult. When the insects are present, some contact controls can be obtained with thorough coverage sprays.

PECAN DISEASES

Pecans are not highly susceptible to

diseases but occasionally are affected by cotton root rot fungus and should not be planted in known root rot areas. Root rot is expressed during hot weather as rapid wilting and browning of tree leaves. Immediate application of fertilizer is needed.

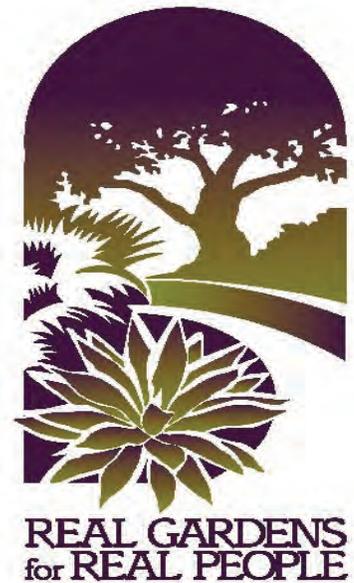
A bacterial disease, crown gall, results in a discoloration of leaves and gradual limb dieback. No control is feasible. Do not re-plant pecans or other deciduous fruit trees in known crown gall affected areas.

(For more details see University of Arizona Cooperative Extension publications *Pecans for Landscaping* by L.F. True and J. R. Kuykendall and *AZ 1400 Pecan Production Guidelines for Small Orchards and Home Yards* by Robert Call, Richard Gibson and Michael Kilby)

The information in this Special Supplement was compiled from the following University of Arizona Cooperative Extension publications: AZ 1001, *Low Desert Citrus Varieties*, co-authored by Michael Maurer and Lucy K. Bradley; AZ 1151, *Irrigating Citrus Trees*, authored by Glenn C. Wright; Publication MC91, *Fertilizing Citrus Chart*, co-authored by George Chott, Carolyn Chard, and Lucy K. Bradley; HE-145 *Citrus: Selection, Storage, Harvest, and Preservation*, revised by Susie Lyons; and Chapter 11 "Citrus Trees" by George Chott in *Desert Landscaping for Beginners* (Arizona Master Gardener Press, 2001). Publication AZ 1269 *Deciduous Fruit & Nuts for the Low Desert*; *Pecans for Landscaping* by L.F. True and J.R. Kuykendall; Publication MC 23 *Home Grown Figs* by Allen D. Boettcher; AZ1450, *Growing Blackberries in the Low Desert* by Dr. Glenn C. Wright



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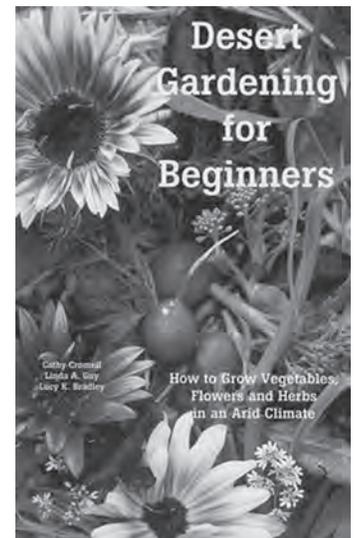
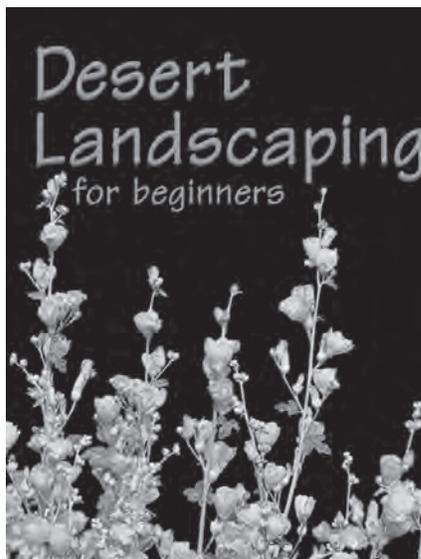
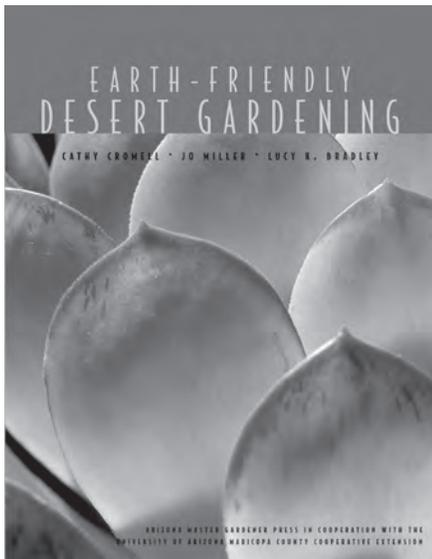
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