

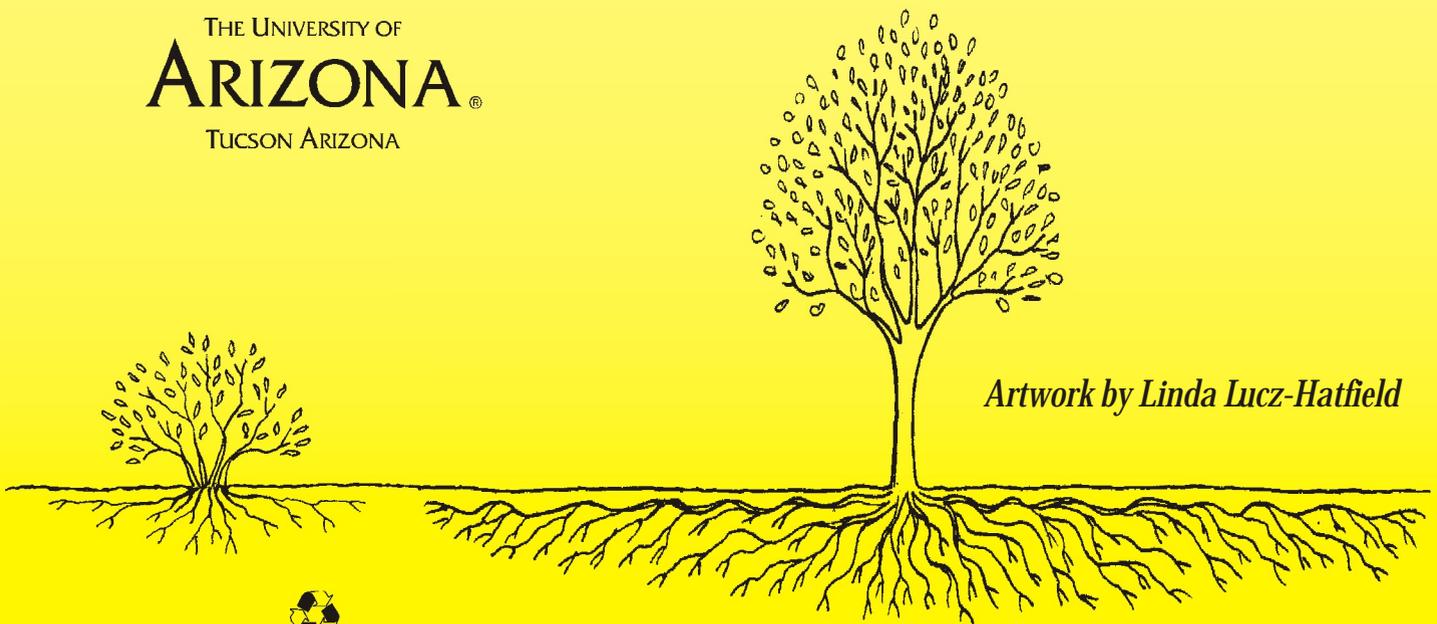
Care of Desert- Adapted Plants

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Insect /Disease Control

Shrubs and trees in poor condition are likely to attract insect pests and are susceptible to damage when attacked. Healthy plants have a natural ability to ward off insects and diseases. This is especially true for plants living in their native habitat. Arid urban environments increase the potential for insect problems in shrubs and trees. Urban stress conditions include extreme temperatures, salty irrigation water, and heavy soils. Further, many trees and shrubs available in nurseries are not adapted to arid climates. Incorrect maintenance practices also create plant stress, and stressed plants become susceptible to insects and diseases. To prevent or reduce insect and disease problems, follow proper planting, pruning, irrigation, and weed control practices.

Making a diagnosis

Careful diagnosis is necessary to determine the cause of a problem. Is the plant getting enough water or too much? Has it been over-fertilized or sprayed with pesticide or herbicide? Are insects visible? After a list of symptoms is noted and the maintenance history of the plant determined, consult the local Extension Office or a knowledgeable nursery person. A qualified person may diagnose the problem over the telephone or provide a suitable reference.

CARE OF DESERT-ADAPTED PLANTS

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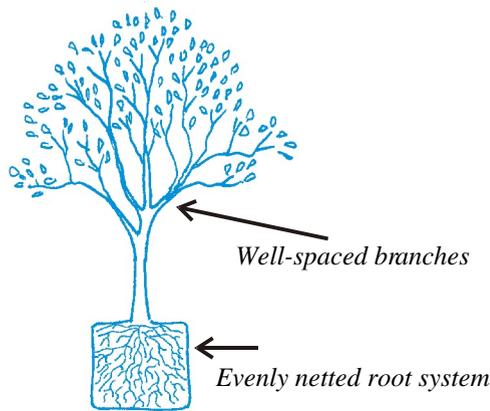
The word xeriscape is derived from the Greek word *xeros* meaning dry. Xeriscape refers to water-conserving landscapes designed to harmonize with the existing environment. Xeriscape gardening recognizes native and other drought resistant vegetation as visually and aesthetically pleasing.

Xeriscape plants are drought resistant, meaning they can survive extended periods of drought with little or no supplemental irrigation. Plants suitable for our desert climate include native plants — plants indigenous to the local area — and plants from other arid climates. These kinds of plants are tolerant of desert-like conditions — low humidity, low rainfall, and alkaline soils.

Xeriscape gardens require less care than traditional landscapes. Some maintenance, however, is required and this brochure is designed to help home gardeners and landscape professionals properly select and maintain xeriscape plants for maximum beauty and plant health.

Plant Selection at the Nursery

Proper plant selection and placement will avoid future landscape problems. Before selecting a plant decide its intended purpose. For example, will it be used for shade, groundcover, privacy? Consider growth pattern; leaf size and texture; presence of flowers, fruits, thorns; and **especially size at maturity**. Determine how much landscape space is available and identify the best location for the plant. Is the location sunny or shady? What are the soil conditions?

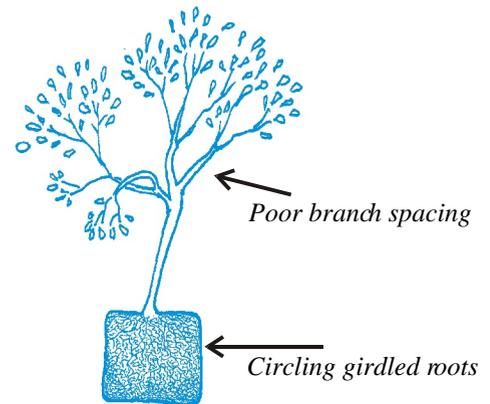


Well-Developed Nursery Tree

Select plants that look healthy — good tissue color, absence of insects and tissue damage — and that do not flop around when gently shaken. Ask about the plant's care requirements and potential problems associated with the plant. Select plants that are well adapted to local environmental stresses: low rainfall, low humidity, and alkaline soils.

Look for good branching structure in trees. Avoid narrow angled branching and poor branch spacing. Be sure the tree does not bend to an extreme angle when the nursery stake is removed. Avoid trees with bark damage, and if possible choose one with small branches still attached to the lower trunk. Be sure that the tree's main stem tapers towards the top (decreases in diameter).

Ask to see the root system of the plant and look for a well-developed root system that is not root-bound. Roots should be light in color and should not be growing out of the drainage hole of the container. Do not purchase a plant if girdling, kinking, or circling roots are found. **Large plants in small containers should be avoided. Good root system development is more important than plant size.**



Poorly-Developed Nursery Tree

Once the plant is purchased, store it in a shady location keeping the roots moist; plant as soon as possible.

Planting Technique

Consider the mature size of a plant before choosing its location. For example, a large tree should not be planted underneath an overhead utility line! If involved in an extensive planting project, call Blue Stake (1-800-782-5348) to determine the location of buried utilities to avoid unfortunate mishaps.

When to Plant

Year-round planting in the desert is possible. The ideal planting time, however, is late fall (except for frost sensitive species) when soil temperatures are warm and air temperatures cooler. This encourages rapid root establishment. Late spring is also good, although root establishment may be slower.

Preparation of Planting Hole

Prepare a hole three to five times as wide as the diameter of the root ball and no deeper than its height. If this disturbs the roots of nearby plants, reduce the width to two times the diameter of the root ball. Before planting make sure that the sides of the hole are rough and sloping.

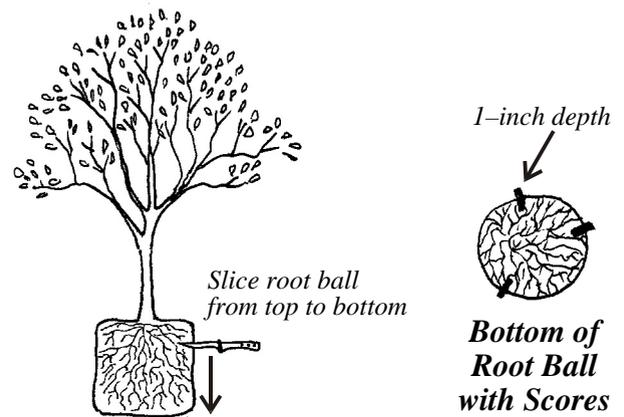
Fill the hole with water prior to planting to check the drainage. The water should drain within 12-24 hours. If *caliche* or hardpan is preventing drainage, dig a chimney or a channel through the *caliche* layer before planting.

Soil Preparation

The addition of organic matter — compost, or forest mulch — is not necessary when planting native plants and plants from other arid climates because they are accustomed to alkaline soils (high pH) which naturally have a very low percentage of organic matter. To increase the water holding capacity of poor soils (very rocky and/or sandy), incorporate some fine-textured native soil into the planting hole.

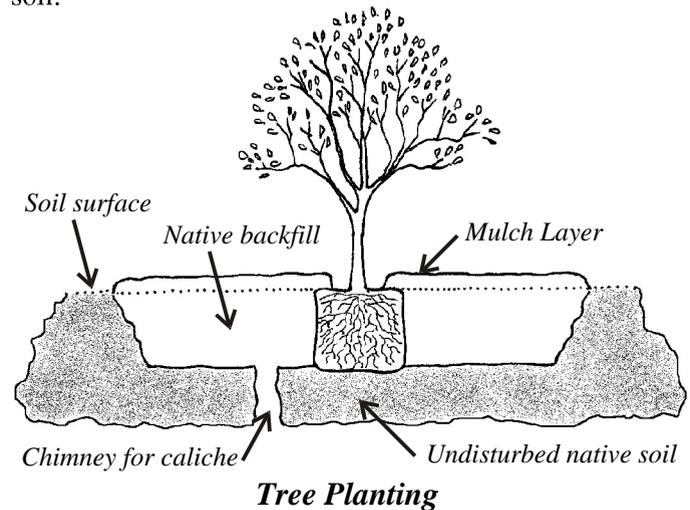
How to Plant

Remove the plant carefully from the container without breaking the root ball. Cut off any girdled, kinked, or circling roots with a sharp knife or pruners. Slice the root ball lengthwise approximately one-inch deep in two or three places.



Scoring Root Ball

Place the plant in the planting hole and back fill with native soil. **The top of the root ball should be level with or slightly above the existing soil surface.** **Planting too deeply can cause crown rot.** Do not compact the soil by standing on it, use water to settle the soil.



After Planting

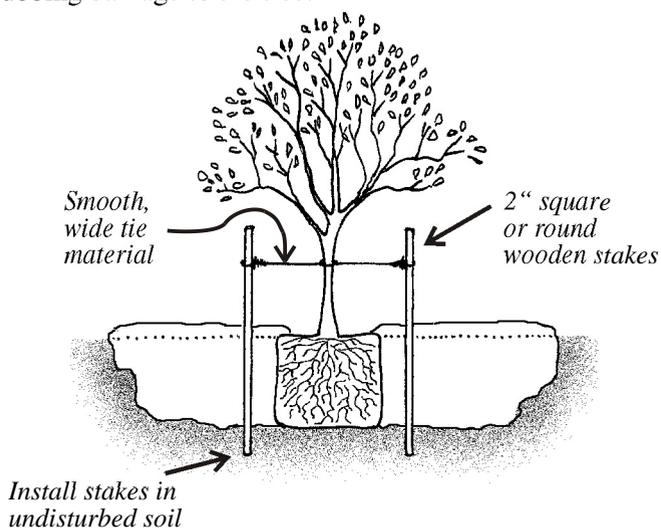
Irrigate the root ball and the planting area immediately, taking care that **the root ball remains level with the soil surface even after irrigation.** **Remove the nursery stake.** If necessary, re-stake the plant following the guidelines in the Tree Staking section. Avoid pruning at this time. **A mulch should be applied to maintain soil moisture, but keep it a few inches away from the base of the plant.** Fertilizer is not required at planting. Nitrogen applications may actually delay root establishment.

Tree Staking

Trees should never be permanently staked. Staked trees develop weak wood and may also develop damaged bark. Staking is not necessary if the tree can support itself after the nursery stake is removed. In very windy locations temporary staking may be beneficial, even if the tree can support itself. If the tree cannot support itself, stake the tree following these guidelines:

Stakes

Use two stakes per tree. Round, two-inch diameter wooden poles are preferred. **Do not use metal pipes or rebar.** Stakes should be placed outside the root ball at a right angle to the ground level and perpendicular to the direction of the prevailing wind. Cut the stakes a few inches above the location of the new ties to prevent rubbing damage to the tree.



Stake Placement

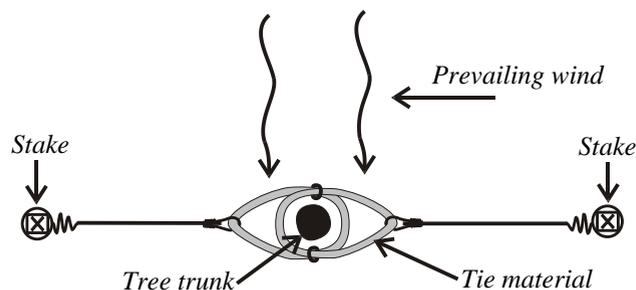
Tie Material

Tie material should be wide, smooth and elastic, for example, polyethylene tape, plastic webbing, or wire covered with hose or rubber tubing. **Uncovered rope, wire or string will damage the tree.**

Tie Placement

Care should be taken when placing the ties. Loosely hold the tree trunk at its base. Slowly move your hands up the trunk and determine the point at which the tree returns to an upright position. Place the ties approximately six inches above this point with one tie on each stake. A second set of ties may be used between the base of the plant and the ties already in place if the tree is still unstable.

Ties should hold the trunk firmly but not restrict movement from the wind. **Movement is necessary for trunk development.** The trunk and tie should move as a unit. Inspect the trunk monthly for damage and loosen the ties as the tree grows.



Overview of Staked Tree with Ties

Tie Removal

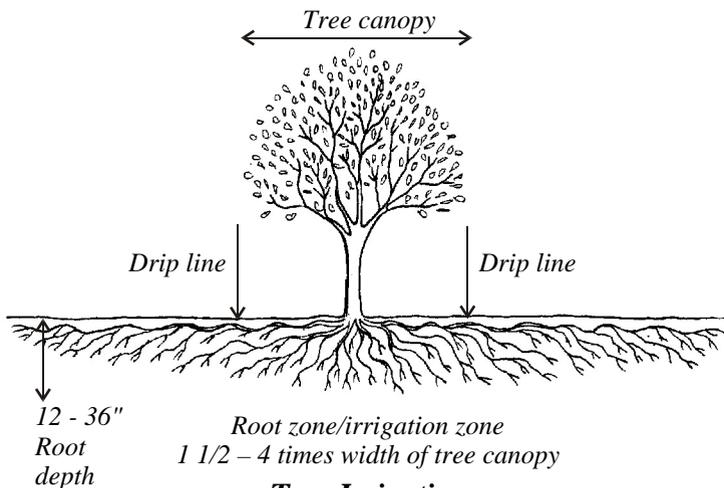
Stakes and ties should be removed as soon as possible. Loosen the ties periodically to determine if the tree can support itself. Although some trees may need to be staked for a year or longer, most will be able to support themselves within one year.

Irrigation Practices

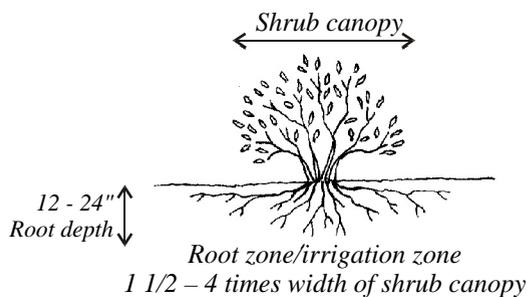
It is not easy to determine a plant's exact water needs, because many factors influence the amount of water a plant requires—plant type, soils, weather, location, and root depth. Although many desert-adapted plants can survive on rainfall, supplemental irrigation will be required for at least one growing season to promote establishment. Once established (approximately 2-3 years), irrigation may be necessary only during dry periods.

How To Irrigate

Light, frequent irrigations create shallow, weak root systems. Deep, less frequent irrigations encourage deep strong root systems that can tolerate longer periods of drought. Mature root systems are typically

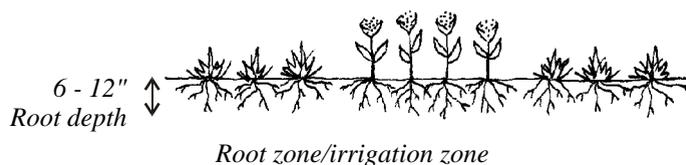


Tree Irrigation



Shrub Irrigation

1½ - 4 times wider than the plant canopy. Rooting depths vary depending on plant type. **Always irrigate the entire depth and width of the plant root zone regardless of the time of year.** Irrigation frequency is dependent on how quickly the soil dries out. Soil texture and plant rooting depth will determine the length of irrigation time; water will move down quickly in sandy soils and slowly in clay soils. Use a soil probe, a long screwdriver, or a piece of rebar to determine how deeply and widely the water has moved. When dry soil is reached the device should stop. To prevent runoff don't apply water faster than the soil can absorb it. Use drip irrigation, a soaker hose, or a slowly dripping garden hose to reduce the flow.



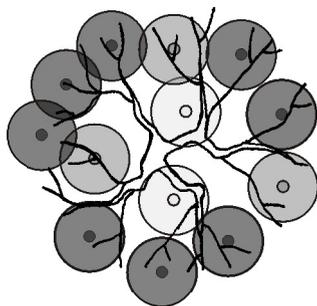
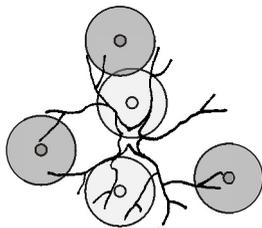
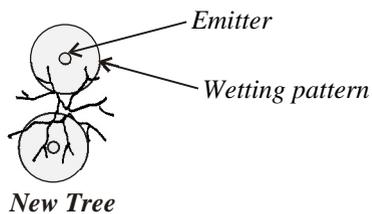
Groundcover Irrigation

If using flood irrigation, provide a berm or form an irrigation border beyond the canopy drip line to prevent runoff. As the tree matures, move the berm outward to compensate for the expanding rooting area. If using a soaker hose or drip irrigation, a berm is not necessary. As the plant matures and the root system expands, add more emitters at and beyond the dripline. In general, sandy soils will require more closely spaced emitters than clay soils due to the narrow wetting pattern.

Re-irrigate when the soil dries out half-way. Feeling the soil, using a soil probe, and observing plant stress will help determine when to re-irrigate. Stress will occur more rapidly during warmer summer months and less rapidly during spring and fall months. Evergreen plants will require infrequent, deep winter irrigations.

When To Irrigate

During the warmer months, irrigate at night or early morning (between 3 - 8 a.m.) to reduce water loss due to evaporation and wind. Soil texture and weather conditions will determine the frequency of irrigations. Observe plants regularly for signs of water stress such as wilted, curled or drooping leaves; yellowing or drop off of older leaves or dead stems or branches. Signs of excess water include: brittle leaves remaining on the plant; wilted shoot tips; soft, smelly tissue; and the presence of algae or mushrooms.



Drip Emitter Placement for Trees (overview)

Little pruning is required to maintain the beauty and natural form of xeriscape plants. If plants are located in areas with adequate space, the need for regular pruning will be greatly reduced or eliminated. However, some minor pruning may be necessary at times and can be beneficial to the plant if done properly.

For very large tree pruning, or trees in contact with power lines or electrical conductors, hire a certified arborist (contact your local Extension Office or check the Yellow Pages). Pruning can be dangerous if done by an inexperienced person.

Plants should not be pruned immediately after planting except to remove dead, diseased or protruding branches. Once a plant has become established — approximately 1-2 years — conservative pruning can begin. Always prune to retain the natural shape of the species. While pruning, stand back to view the developing shape. Never remove more than 1/3 of a plant during one season (the exception is rejuvenation of old plant material). If in doubt about what to remove, don't.

Trees: Branches along the lower trunk should be allowed to grow for at least two years before removal because they encourage strong trunk growth, protect the trunk from sunburn and reduce resistance to wind.

Remember that trees should never be topped (stubbed). If it is necessary to lower the height, prune back selectively. Always prune back to a side branch that is at least 1/3 - 1/2 the diameter of the size of the branch being cut off.

When to Prune

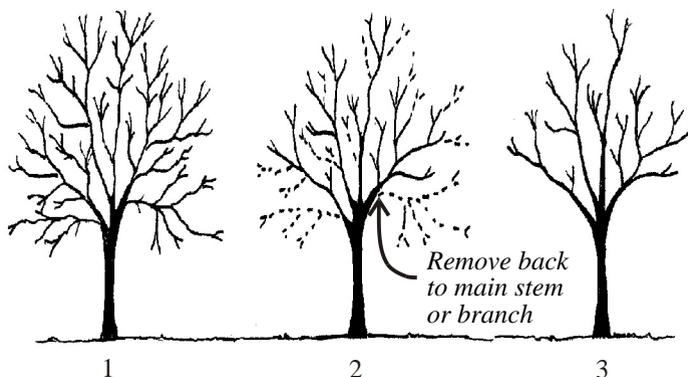
Light pruning may be done anytime if proper pruning techniques are followed. For deciduous plants, heavier pruning should be done when plants are dormant—after leaf drop in fall or before bud break in early spring; for evergreen plants, late fall or early spring is best. In general, avoid pruning when plants appear stressed or during periods of prolonged heat or high humidity.

To increase bloom, prune spring bloomers just after periods of bloom and summer bloomers before bud break in spring. For plants with more than one blooming season, prune after the fall blooming period.

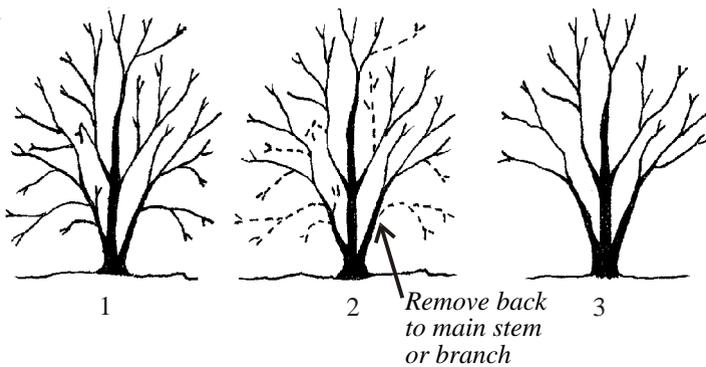
How to Prune

Use the proper pruning tools and make sure they are sharp and clean. A 10% bleach solution will sterilize tools sufficiently. Use a pruning saw for branches greater than one inch thick. **Always make smooth cuts and avoid crushing plant tissues.** Be sure to use the proper pruning cut to get the desired result. Pruning methods include thinning, heading, pinching and rejuvenating.

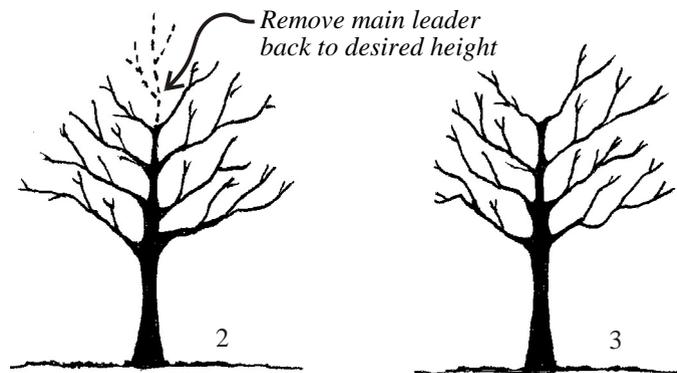
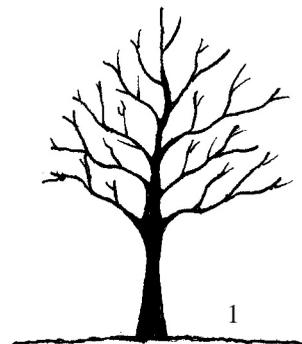
TREE PRUNING



Standard Tree Thinning

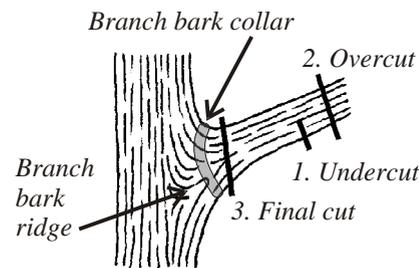


Multi-Trunk Tree Thinning



Tree Heading to Control Height

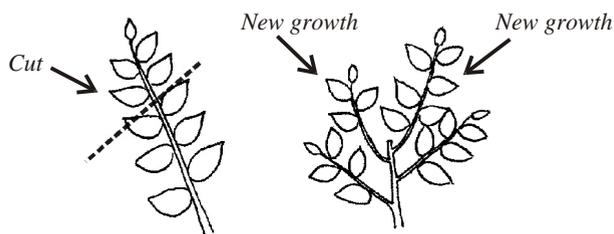
Trees: Retain the strongest branches. Remove damaged, weak, crossed or narrow angled branches. Remove branches protruding into the canopy, growing downward from the canopy and suckers growing from the ground or base of the plant. Make smaller cuts first. For larger branches, make a three-point cut to prevent bark tearing. Do not prune into the branch bark ridge or collar. Prune close enough, however, to leave no stub behind. **Do not use pruning paint or any kind of sealant.**



Three-point Cut for Large Branches

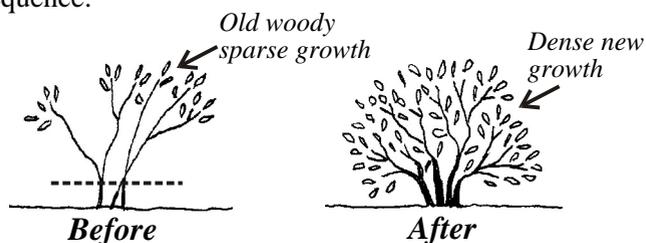
Shrubs: The pruning principles for trees also apply to shrubs. In most cases, however, shrubs require less pruning. Avoid shearing shrubs into unnatural forms (boxes and balls) and encourage natural growth form. If shearing or hedging is done keep the bottom of the shrub wider in diameter than the top and include some thinning cuts. This allows greater sunlight penetration and encourages internal leaf growth.

Pinching may be done to promote the development of a bushier, more compact shrub. Pinching can take place at any time.



Pinching to Encourage Dense Growth

Pruning to rejuvenate summer and fall blooming shrubs that have become woody should take place during late winter or early spring. For spring blooming shrubs, rejuvenate after the bloom period, but before hot weather. Thinning should also be done in the same sequence.



If frost damage occurs, remove the damaged tissue when new growth appears in spring. For plants that routinely freeze in the winter, prune back to the plant base in late winter, approximately six inches.

Plants such as cactus, yuccas, desert spoons, agaves, and ocotillos do not require routine pruning. Dead or diseased parts or old flower stalks can be removed as needed.

Fertilizers

Xeriscape plants usually do not require fertilizer unless nutrient deficiencies occur, which is uncommon. Fertilizing can be used to encourage rapid growth, but this will also increase water use and pruning requirements.

Nitrogen and iron are the two nutrients most commonly lacking or unavailable in desert soils. Nitrogen levels are low because arid soils lack organic matter. Iron is plentiful but deficiencies occur because iron availability (solubility) in alkaline soils is limited. In addition, weather extremes (cold, wet, or extended dry conditions) can further reduce available iron.

Both nitrogen deficiency and iron deficiency can produce chlorosis — yellowing of plant tissues. This is most typically seen in non-native plants. Nitrogen deficiency causes the older leaves of the plant to become chlorotic first; new leaves may follow. Nitrogen deficient plants require fertilization. When iron is deficient plant veins are green and the rest of the leaf is yellow. New leaves become chlorotic first; older leaves may follow. Plants with an iron deficiency may recover on their own when the weather is warmer and drier. If not, applications of chelated forms of iron may help.

Although phosphorus and potassium are plentiful in desert soils, phosphorus can be incorporated into the soil at the time of planting to increase blooming of flowering plants.

Fertilizer Types

There are two kinds of fertilizers: inorganic and organic. Inorganic fertilizers, such as ammonium nitrate, ammonium sulfate and urea are derived from natural mineral sources. They are highly soluble and release nutrients very quickly. Use an inorganic fertilizer on plants showing a nutrient deficiency because they release nutrients rapidly and uniformly.

Natural organic fertilizers are derived from animal and plant sources such as compost, blood and bone meal. Always use well-decomposed natural organic material. Synthetic organics include: ureaformaldehyde (UF), isobutylidene diurea (IBDU), and sulfur-coated urea

(SCU). Organic fertilizers release nutrients less uniformly and more slowly depending on weather conditions. In general, organic fertilizers will need to be applied less frequently due to their slow release and inorganics more frequently due to their rapid release.

When to Fertilize

Apply fertilizers just before or during a growth spurt. (Early spring to late summer) Avoid fertilizing in late fall. This stimulates tender growth that may be frost sensitive. Plants will not take up nutrients when they are not actively growing — during very hot, cold, or wet conditions. Fertilize before a scheduled irrigation, not after the soil is already wet.

How to Fertilize

Always irrigate sufficiently when applying fertilizer. Nutrients must be dissolved in water to enter the roots of the plant. Watering too deeply can cause nutrients to move below the root zone. Phosphorus fertilizers are useless as topdressing and need to be incorporated into the soil. **Always read and follow the label directions for application rates and guidelines.**

Mulches

A mulch is a layer of insulation between the soil surface and the atmosphere. Mulches can reduce evaporation, erosion and compaction; moderate soil temperatures; increase water penetration; protect roots from mechanical injury; and reduce weed growth. Mulches can be used to cover large areas, reducing the need for vegetation.

There are two types of mulches: organic and inorganic. Organic mulches that work well in the landscape include coarse material, such as wood chips or bark, that will not blow away. Apply organic mulches 2 to 4 inches deep away from the base of the plant and out beyond the drip line. As organic mulches decompose, they need to be replaced. Examples of inorganic mulches include decomposed granite, pea gravel and river rock. Apply inorganic mulches 1/2 to 2 inches deep. All mulches should be kept 6 to 8 inches away from the trunk or base of the main stem.

Weed Control

Consistent weed control is important because weeds compete with landscape plants for water, nutrients, and sunlight. Eliminate weeds before they set seed to reduce future weed problems. Manual weed removal can be effective when populations are low. In extreme cases, however, chemical control may be necessary. Black plastic is not recommended for weed control.

To prevent future weed seeds from germinating, treat the soil with a pre-emergent. **Do not use pre-emergent in areas which contain seeds of desirable plants, such as wildflowers.** Mulches can reduce weed seed germination by preventing exposure to sunlight.

If a weed problem seems to justify the use of chemicals, contact your local Extension Office to determine which to use and proper uses. **Always read and follow label instructions.**