



COLLEGE OF AGRICULTURE & LIFE SCIENCES

Cooperative  
Extension

# Backyards & Beyond

RURAL LIVING IN ARIZONA

SPRING 2016

VOLUME 10, NUMBER 2





## ▶▶▶ FEATURED PLANT

Trees of Southeastern Arizona, Coronado RC&D Area, Inc. and Conservation Districts of Southeastern Arizona

**Common Name:** Foothill paloverde

**Scientific Name:** *Parkinsonia microphylla*

Foothill paloverde is a long-lived large shrub or small tree with a height of 12 to 25 feet. The bark is yellow green. Foothill paloverde flowers in late April and May. Flowers have 5 pale yellow petals, often the largest petal (banner) is white or cream-colored. Seed pods are rounded, pointed at the tip and mature to a light brown with constrictions between the seeds. Leaves are bipinnately compound with one pair of pinnae on a very short rachis. Four to eight pairs of very small leaflets are attached to each pinnae. Stems are yellow green, grow in a zigzag manner, and taper to a spiny tip. It is also called littleleaf paloverde or yellow paloverde due to its very little leaves and when in blossom the flowers are bright yellow.

As the name implies, foothill paloverde is found on rocky slopes in foothills of desert mountains; it also occurs on gravelly flats and plains and sometimes along washes. Foothill paloverde occurs throughout much of the Sonoran Desert in southern Arizona, southeastern California, Baja California and Sonora, Mexico at elevations from 500 to 4000 feet.

The paloverde is the primary nurse plant for young saguaro cactus. Native Americans eat the seeds fresh from the pods and grind the seeds into flour or meal. Seeds and seedlings are also utilized as food by many small rodents and rabbits. Bees and other insects are attracted to the flowers. Flowers and twigs are browsed by livestock and wildlife.



ART MEEN

## ▶▶▶ FEATURED BIRD

Dan L. Fischer - Author of Early Southwest Ornithologists, 1728-1900, University of Arizona Press

**Common Name:** Lesser Goldfinch

**Scientific Name:** *Carduelis psaltria*

Lesser Goldfinches are the smallest, most common and widespread of the four *Carduelis* finches that occur in Arizona. The American and Lawrence's are generally considered uncommon or erratic with few nesting records within the state. The fourth in the genus is the Pine Siskin, a common small bird frequenting tall coniferous forests of the higher mountains, especially during the breeding season.

Lesser Goldfinches might hardly be noticed except for several distinctive attributes that bring them into focus. Only four inches in length, they are gregarious and assemble in small groups that easily aids in locating them. Although the birds residing in Arizona have a dark greenish back (differing from south Texas birds with blackish backs), the males are endowed with a bright yellow breast, as their common name implies, that is often quite brilliant in sunlight. When taking flight, especially in a flock, the bright white patches of their darker wings are very noticeable.

Often heard before being observed, Lesser Goldfinches are songsters, producing a lovely series of sweet twitters and trills that are quite

distinct. They are also capable of including in their repertoire many imitations of other species. While in the field, Thomas Say, the discoverer, noted its song and later when describing the species applied the Greek name *psaltria* meaning "a lutist" for its vocal qualities.

Lesser Goldfinches are generally found near riparian locations of deciduous trees where water is available and also in most established residential areas. The abundance of seeds and buds from trees and various wild flowers, especially composites are a favored diet. Not a ground dweller, they secure these food sources directly from the plants while they are still attached. They have a strong preference for thistles where the birds actively group and engage in ripping apart the maturing flower heads. They also feed on tiny insects.

Attacks by aerial predators on these tiny Lesser Goldfinches and their nests are quite frequent. They must always be vigilant and when pursued often manage to escape by diving into a dense bush when available. Some attackers such as the Loggerhead Shrike often plunge into the brush after them, but the older finches are sometimes able to quickly flee and



DAN L. FISCHER

then out-manuever their attackers through aerial skills by twisting and turning or sharply flying upward in tight circles to gain a safe distance.

Lesser Goldfinches nest through the summer months and usually lay 4 or 5 very pale blue or greenish eggs in a small nest, usually in a fork well hidden in dense foliage. Incubation and nest building is done by the female. Incubation is about 12 days and the young depart in a similar period. Both parents feed by regurgitation.

Say made the discovery of the Lesser Goldfinch with his assistant Titian R. Peale while on the Major Stephen H. Long Expedition along the Arkansas River to the Rocky Mountains in 1819-20.





TONDA

**Spring 2016**  
**Volume 10, Number 2**

**Editors**

Bryan Chadd, Susan Pater, George Ruyle

**Graphic Design & Layout**

CALS Communications & Technologies

Backyards and Beyond is partially funded by the Renewable Resources Extension Act. Financial gifts may be contributed online at <http://extension.arizona.edu/state/donate-arizona-cooperative-extension> or to make your gift by telephone, please contact the CALS Development Office at 520-621-7190. Gifts can be made payable to: "University of Arizona Foundation" and mailed to: Arizona Cooperative Extension, 301 Forbes Building, PO Box 210036, Tucson, Arizona 85721.

Backyards & Beyond is refereed and published quarterly by a cooperative team from the University of Arizona Cooperative Extension.

**Yearly subscription price \$10.00**  
<http://cals.arizona.edu/backyards>

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Jeffrey C. Silvertooth, Associate Dean & Director, Economic Development & Extension, College of Agriculture and Life Sciences, The University of Arizona.

The University of Arizona is an equal opportunity, affirmative action institution. The University does not discriminate on the basis of race, color, religion, sex, national origin, age, disability, veteran status, or sexual orientation in its programs and activities.

Any products, services, or organizations that are mentioned, shown, or indirectly implied in this publication do not imply endorsement by the University of Arizona.

# Backyards & Beyond

## CONTENTS

Plant Selection and Selecting Your Plants ..... 4

Drip Irrigation .....10

Chia Seeds ..... 13

Pruning Shrubs ..... 15

Mowing Turfgrasses .....22

Subscription .....23

COVER PHOTO CREDIT: SANDDE BEAUTHELL

TONDA

# PLANT SELECTION & SELECTING YOUR PLANTS



**Tom DeGomez**, Former Regional Specialist and Area Agent  
**Elizabeth Davison**, Former Lecturer, School of Plant Sciences  
**John Begerman**, Former Urban Horticulture Agent  
**Jimmy L. Tipton**, Former Arid Ornamental Extension Specialist

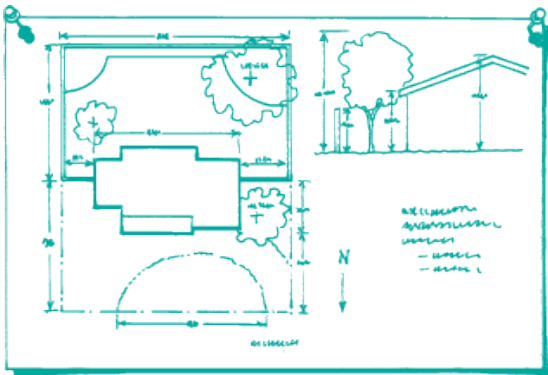


Figure 1: Example of scale drawing of property showing available space for plants

Whether you are beginning a new landscape or renovating an existing one, planning ahead can prevent many problems.

The majority of maintenance requirements and plant problems result from either selecting the wrong kind of plant for a location or planting an inferior specimen of the selected plant type. In other words, there are two decisions to be made:

- What species, or kind, of tree are you going to buy — an oak, pine, mesquite, or acacia?
- Assuming you decide on an oak, which one in the row of oaks at the nursery are you going to buy?

The first decision is called Plant Selection and the second is Selecting Plants. Our goal is to install the right plant in the right place. This publication will cover the factors involved in making good decisions to achieve this goal.

## Plant Selection

To choose a type or species of plant you need to consider the characteristics of the site and the intended function of the plant. These will help you decide which plant characteristics would be most desirable. Following are the steps to analyze the site where the new plant will be located.

### Site Characteristics

Investigate your property. Take the time to note both permanent and seasonal conditions.

#### Space

**Above ground.** The most important consideration, and the one most often overlooked, is the available space. Know the size and shape of above ground space at the property. Accurately measure and make a scale drawing of your site. Know heights of walls and eaves. You will want to avoid plants that outgrow the space on your site. See Figure 1.

**Below ground.** The roots of a mature tree or shrub extend 1.5 to 4 times the width of the canopy. For example, the root system of a tree with a 30 ft. wide canopy could be 45 to 120 feet wide. Obviously, many trees grow with roots confined to a much smaller area. Still, it is a mistake to put a large tree with a broad root zone in a narrow planting bed, such as in a parking lot median. See Figure 2.

**Consider the utilities.** Do not plant near underground utility lines or severe root damage may occur if utility repairs become necessary. Call Blue Stake to locate underground utility lines on your property. Know the approximate underground space available and the location of all underground utilities, including water pipes.

#### Environment

**Climate.** Climate zones can be very helpful in deciding which plants are suited for your landscape. Sunset Magazine describes five climatic zones in Arizona. The US Department

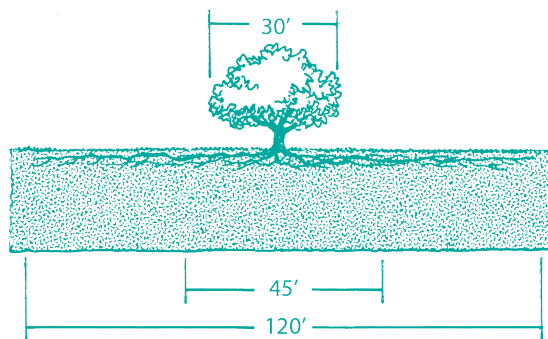


Figure 2: Root zones for most trees, wide and shallow.



of Agriculture publishes a cold hardiness map, based on average annual minimum temperature, which can be useful in higher elevations.

Microclimates may further restrict the types of plants that can be grown in a location. Numerous microclimates may be present on one property. The middle of a parking lot, for example, will be hotter than the surrounding area due to heat radiating from the asphalt. The valley floor at the base of a mountain is often colder due to cold air flowing down from higher elevations. Likewise, the north and east sides of a building will be cooler than the south and west sides. Know your climatic zone and whether the site is especially cold or hot for that zone. See Figure 3.

**Dry/wet locations.** Some parts of the site may be subjected to drought or flooding. Examples of dry locations might include the end of a drip irrigation circuit or the middle of a poorly spaced sprinkler system. The area next to a hose faucet or the lowest point in the landscape may be wet. You may also be considering a site that is intentionally not irrigated or periodically flooded.

**Exposure.** Less sunlight will be available on the north and east sides of a structure than on the south and west sides. Some plants will take the full sun of a southern exposure, but not the reflected light and heat on the west side of a building. Any existing trees will throw a shade pattern that moves through the seasons. Classify the site as being in the shade, part shade, full sun, or reflected sun.

## Soil

**Depth.** Eighteen inches to three feet of soil is adequate for trees and shrubs. Consider adding soil if you have less than six to eight inches.

**Texture.** Soil can be a sand, a silt, a clay, or some combination of these three, called a loam. Sandy soils drain well, are well aerated, and resist compaction, but do not hold water or nutrients well. Clay soils do not drain well, are poorly aerated, and easy to compact. However, clay soils hold water and nutrients very well. Silty and loamy soils are between these extremes. See Figure 4.

Plants that require a well-drained soil generally do well in sand or sandy loams. Those that prefer a fertile soil may do better in a soil which contains higher amounts of silt or clay.

Know the soil texture at your site. A nursery consultant or Cooperative Extension Master Gardener can estimate texture from a two to four cup soil sample.

**Compaction/Drainage.** Most urban soils are compacted to some degree. Pedestrian traffic is often to blame. Compacted soils limit water penetration, air exchange, and root growth. Flood irrigation also compacts clay-type soils. Many desert plants require a well-aerated soil and do poorly in compacted sites where water can't move beyond the root zone.

Drainage may also be influenced by layers in the soil that are relatively impervious to water and air. Bedrock, caliche, or clay layers can all cause poor drainage and restricted air movement. Identify these areas on the site. See Figure 5.

**pH (acidity/alkalinity).** The acidity or alkalinity of a soil influences nutrient availability and the presence of some soil pathogens. Most soils in Arizona are alkaline (pH greater than 7.0), but there are some areas of neutral or acid soils. Although some alkaline soils can be made more acid by adding elemental sulfur, this effort must be repeated each season to have any lasting effect.

More importantly, most alkaline soils in Arizona are also calcareous (high in calcium). It is very difficult to change the pH of a calcareous soil. Pour a little acid, such as vinegar, on the soil. If the reaction produces bubbles the soil is calcareous. Grow only those plants that prefer your soil type. Plan to grow acid-loving plants (hibiscus, gardenias, etc.) in large patio containers with artificial potting soil.

**Salinity.** Alkaline soils are often salty. If you see white rings surrounding drip emitters, you may have a salinity problem. For many plants, salinity problems can often be avoided by periodic heavy irrigations if the water is not salty. However, some plants are very sensitive (maples and sycamores) while others are very tolerant (palms).

**Fertility/toxicity.** Sandy soils tend to be low in fertility while clay loams tend to be high. Although most plants adapted to the alkaline soils of the southwest can tolerate

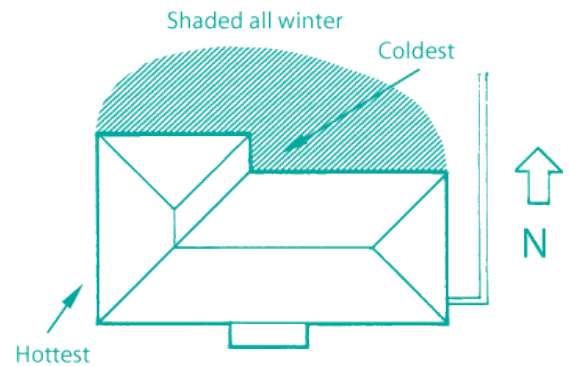


Figure 3: Typical drawing of a property showing several microclimates.

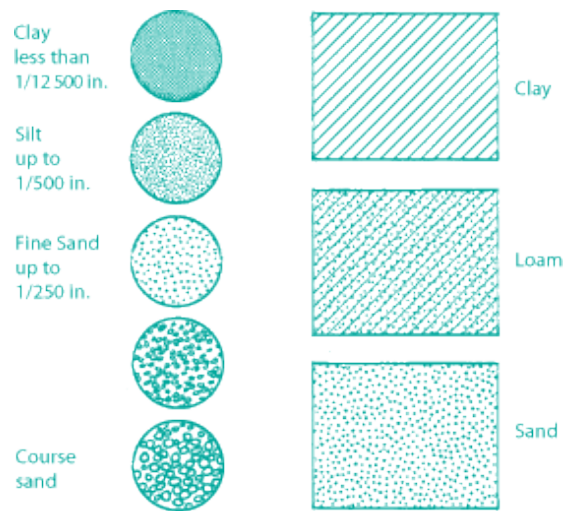


Figure 4: Three mineral components of a soil—sand, silt and clay are determined by the diameter of the particle.



Figure 5: Caliche layers prevent roots and water from penetrating into deeper soil.





Figure 6: Trees and shrubs should be planted where they will not interfere with buildings, streets or utility lines.



Figure 7: Plants used as floors in a landscape design are a variety of shapes and sizes.



Figure 8: Consider the height of plants before planting to ensure that they accomplish the desired result.

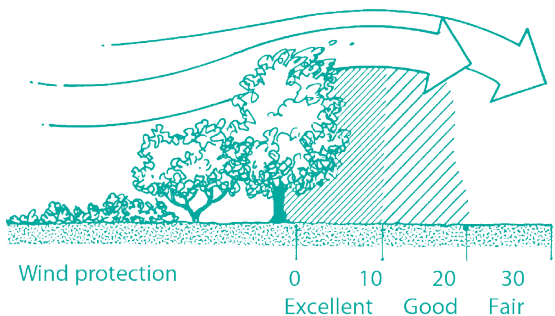


Figure 9: Windbreaks slow the speed of the wind on the windward and leeward side of the rows of plants. The greatest effect is on the leeward side.

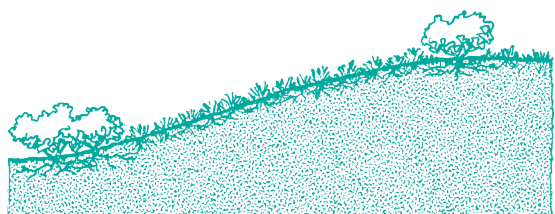


Figure 10: Water erosion can be reduced by establishing dense growing plants on slopes and other erodible sites.

infertile soils, it is wise to be aware of potential problems. Iron is often unavailable and can cause citrus, pyracantha and other plants to develop iron chlorosis. An excess of any one nutrient (sodium or boron, for example) may cause toxicity problems in sensitive plants. For information on fertilizing gardens refer to Arizona Cooperative Extension publication AZ1020.

## Pests

Be aware of significant, common insect infestations in your area. Examples might include whiteflies in the Phoenix and Yuma areas, lawn grubs, palo verde borers, agave weevils, seasonal grasshoppers, etc. Cooperative Extension bulletins can give more information.

**Diseases and related pests.** Know if your soil harbors nematodes, Texas (cotton) root rot, or similar problems. The presence of soil diseases can limit your choices for landscape plants. Cooperative Extension bulletins can give more information.

**Mammals.** Probably the most common mammal pests are rodents, deer, gophers, rabbits, elk and javelinas. Under harsh conditions, these animals will probably eat almost any plant or its roots. Under normal conditions these animals may avoid some plants. Rabbits, for example, apparently do not care for apache plume. For more information on deer and rabbit damage, refer to Arizona Cooperative Extension publication AZ1237.

## Plant Function

### Size

Review the scale drawing of your lot. Begin to think about mature plant sizes. Do not plan for tall trees, such as palms or big pines, under an electric line, or low, wide trees, such as a palo verde, in a city street median near a sidewalk. A tree or shrub should be placed no closer to a building than one half the mature width. See Figure 6.

### Architectural

**Floors.** Plants that are going to be used as a floor should be dense, low growing, and tolerant of traffic if they are going to be walked on. Some ground covers collect trash or are difficult to weed. See Figure 7.

**Walls.** Plants used as screens should be dense and tall enough to provide a visual barrier. See Figure 8. They may need to be tolerant of hedging. The plant's final size should allow visibility if it is necessary (ex: at corners of lots).

**Ceilings.** Plants used as ceilings should be dense and tall enough to walk under without constant pruning. Vines on overhead trellises may be deciduous and thus messy.

**Aesthetic.** Most people probably over-emphasize the aesthetic function of plants when planning their landscape. Opinions will vary as to what is attractive.

### Engineering

**Wind reduction.** In the arid Southwest, windbreaks are effective in reducing wind speed and drying effects (allowing for reduced water consumption). Windbreaks should be planted perpendicular to the prevailing wind and should be several rows of different type plants (ex: one row trees, one row shrubs, one row small shrubs). The plants need multiple stems and dense foliage that reaches ground level. Fibrous roots are also helpful for reducing soil erosion. See Figure 9.

**Water erosion reduction.** Plants used to prevent water erosion, such as on a slope, should be spreading with dense foliage close to the ground and with fibrous roots. See Figure 10.

**Noise abatement.** Plants can be effective in reducing noise, but the belt of vegetation needs to be twenty-five to fifty feet wide. It should have several rows of different plant types, some evergreen and some deciduous. A variety of leaf shapes will mask sounds.

**Pedestrian traffic management.** Plants can be used to direct pedestrian traffic. Sometimes simply a dense, thick groundcover will work. For a more substantial barrier, select flexible, dense plants that are multistemmed and/or thorny.



**Glare and reflection management.** Dense, tall plants are best for blocking unwanted light. If blocking sunlight is a goal, be sure to plan for the movement of the sun throughout the day and throughout the year. See Figure 11. Deciduous trees on the south side will allow low sun to warm the building. Ground covers and low shrubs will cut glare and reflected heat from sandy soil or gravelly areas. See Figure 12.

## Climatological

**Shading.** Dense canopies, such as mulberry, may restrict what you can grow underneath. Filtered shade from less dense canopies may be as comfortable while allowing undergrowth. Consider also the natural canopy shape. Compare, for example, the shade cast by an Italian cypress with that from an ash. Again, be sure to plan for movement of the sun throughout the day and throughout the year. See Figure 13.

**Temperature moderation.** Shading the south or west sides of a home with plants that can take the high light and heat can result in a temperature reduction of several degrees. Cacti cast heavy shadows late in the day. Vines can be supported on cables/wires/fencing or may climb directly on stucco. See Figure 14.

**Cold air flows.** Evergreen plants can redirect cool air flows toward the living area. A single row of these plants can be sufficient under some conditions. See Figure 15.

## Special Considerations

**Wildlife attraction.** Plants provide habitat and food for attracting wildlife to your landscape. Conspicuous fruits, both fleshy and dry, will attract birds. Thorny plants provide safe nesting. Showy, nectar-bearing flowers may attract hummingbirds or butterflies.

**Food.** Choose fruiting trees and vegetables for an 'edible landscape'.

## Selecting Plants

Once you have decided on the type or species of plant that meets your needs, you are ready to select an individual plant. Here are the factors to keep in mind when selecting this plant. A reputable nursery is your best source of information and will stand behind their products. In the long run, it pays to search out properly grown plants.

## Good proportion

Select a plant that is average size relative to the container or root system. Do not pick the largest plant, that may be root bound in the container, nor the smallest, that may not have been in the container very long.

## Vigorous and healthy

**Staking.** Many growers tie young trees on nursery stakes for ease of production and transport. The net result of such practice is that a new tree's trunk may be weak. You, the final consumer, will remove the nursery stake when you plant the tree (See Arizona Cooperative Extension Bulletin #AZ1022 Planting Guidelines: Container Trees & Shrubs). However, the tree may need to be staked for the first year. You can avoid this requirement by looking for trees with strong trunks that can stand alone. Try to find a plant without a nursery stake. Avoid trees with inverse taper (the trunk is wider just below the leaves than at the soil line). See Figure 16.

**Problems.** There should be no evidence of insects or disease. The leaves should be uniform in size and color. There should be no fungal or weed problems in the container. Neither the trunk nor any branches should be bruised, broken, or damaged. Look for bruised, tattered, or torn foliage (a sign of wind drying) and dried, shriveled twigs and buds.

## Structure

The natural species habit or shape should have been maintained throughout production.

**Trees.** Many native trees in the southwestern US typically grow from multiple trunks. Look for these species (palo verdes, mesquites, ironwoods, some acacias) to have two or more main trunks ("multi"). Multiple trunks are a little more difficult to produce,

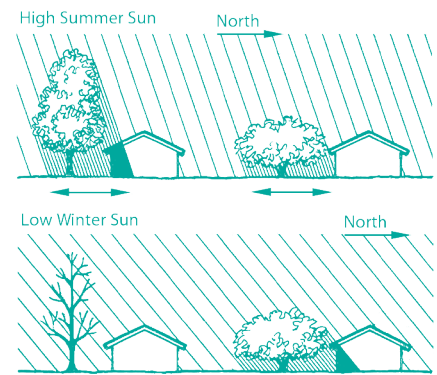


Figure 11: Trees placed on the south and west exposure of a home can increase shading. If the trees lose their leaves in the winter the sun can help to warm the buildings.

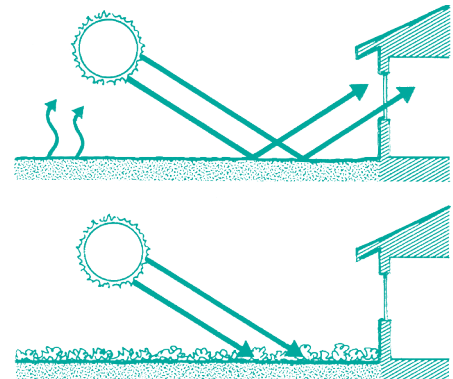


Figure 12: Low growing plants will cut glare but will not prevent sun from entering windows.

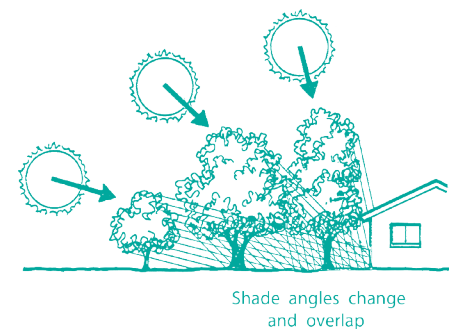


Figure 13: Shade angles change and overlap as the seasons progress through the year.



Figure 14: If tall trees are not possible, lower growing plants close to the building can provide temperature moderation.

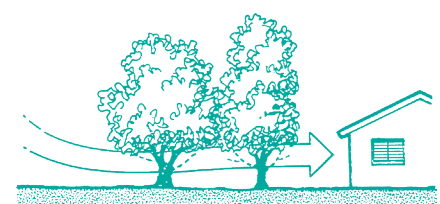


Figure 15: These evergreen trees are directing air under the canopy and towards the building.



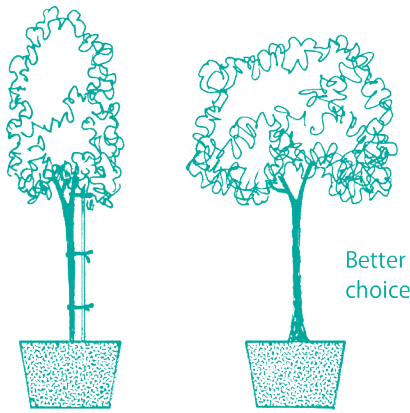


Figure 16: Select good trees in the nursery to avoid problems as the plants get older.



Figure 17: The tree on the left is a multiple trunk tree, the one on the right a single. Be sure the species fits the proper form.

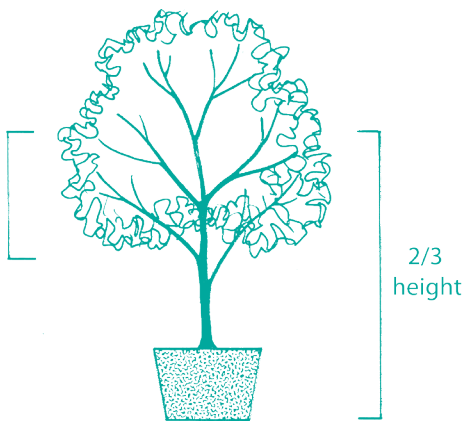


Figure 18: This tree has more than one half of its branches coming from the bottom 2/3 of the plant.

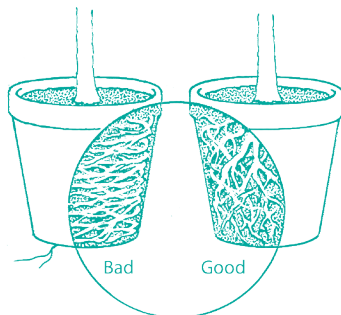


Figure 19: Roots should not be spiraling around in the container. (root bound).

because they are less frequently staked. They do tend to be sturdier trees once they are established on the site.

Many other tree species grow naturally from a central leader (oaks, ashes, all conifers). For these species, look for a strong, single central leader, straight in the container or root ball, with good taper (wider at the bottom than the top). See Figure 17.

For any tree, limbs should be strong and healthy. The branches should be evenly spaced vertically and radially around the trunk(s) with wide branch angles.

For all trees, the branches should be evenly distributed along the plant. One half the foliage should be on branches originating on the lower 2/3 of the plant, not concentrated at the top. See Figure 18.

Avoid grafted or budded trees with suckers arising below the union. Avoid plants with flowers or fruit (they divert resources that could be used to establish the tree after planting). If you are selecting plants based on a specific flower or fruit color or characteristic, remove the flowers and fruits when planting.

**Shrubs.** There should be several well-spaced trunks arising from a visible root crown. The foliage should be evenly distributed in the upper two thirds of the plant, not concentrated at the top. Avoid plants with flowers or fruit.

## Root system

**Container grown plants.** The root crown or flare should be visible. Avoid plants planted too deep in the container. Avoid root-bound plants; there should be few or no roots emerging from the container drain holes. The container media should not be washing out the drain holes. Scratch the surface to see if there are encircling roots; these will cause problems later. There should be no weeds in the container. Roots, if visible, usually should have white tips. With the assistance of a nursery worker remove the plant from the container to inspect the roots. See Figure 19.

**Containerized plants.** These are plants that were grown in the field then dug and put in containers. Follow the guides for container grown plants, but also ask how long the plants have been in the containers. Plants that were dug a month or so ago may not be well rooted yet. Those dug a year or more ago may be root bound.

**Ball & Burlap (B&B).** The rootball should be compact and firm, not loose or broken. The ball should be moist, but not wet. Given the choice, select a plant with natural fiber burlap, rather than plastic that will not degrade in the soil. Handle B&B plants with care.

**Bare root.** There should be fibrous roots visible. The major roots should be fresh, plump (not slimy) and cut cleanly, not broken or crushed. The roots should be moist, but not wet. Select a plant with major roots radiating in three or four directions, equally spaced around the trunk.

## Origin

In general, plants grown in a climate similar to yours will adjust more quickly and perform better. Given the choice, select a plant grown locally.



## Plant Characteristics

You have analyzed your site and determined the function you want the plant to serve.

Now use this checklist to select the plant characteristics compatible with your site and functions.

This is your Wish List. Make copies for future purchases.

Diversity in container sizes

- Trees are available in sizes from 5 gallons to large boxes.
- Shrubs come in 1 gallons to 5 gallons

- Perennials are available in 4" pots to 2 gallon sizes.
- Bedding plants are sold in 6-packs to 1 gallons.
- Buy a few plants in large containers, a few in medium sized containers, and a few in small containers.

A note on availability: You want a plant that will thrive in your landscape. Your neighbors, commercial landscapes, botanical gardens, and reputable nurseries can give you ideas. However, be cautious in choosing species that are used everywhere. Pest infestations or diseases can spread rapidly through whole neighborhoods where everyone has the same plantings.

## Botany/Horticulture

### ■ Plant type

- \* Herbaceous
- \* Succulent
- \* Groundcover
- \* Shrubs
- \* Vine
- \* Tree
- \* Subshrub

### ■ Life span - do you like re-doing gardens?

- \* Annual
- \* Perennial
- \* Biennial

### ■ Mature Size - fits space available?

- \* Height \_\_\_\_\_ feet/inches
- \* Width \_\_\_\_\_ feet/inches

### ■ Leaf duration

- \* Deciduous
- \* Semi-evergreen
- \* Persistent
- \* Evergreen

### ■ Important Considerations

- \* Not weak-wooded
- \* Non-thorny
- \* Non-allergenic
- \* Native
- \* Non-poisonous
- \* Fast growth
- \* Edible
- \* Long-lived
- \* Thorny

## Cultural

### ■ Tolerance to site characteristics

- \* AZ Climate zone
- \* USDA hardiness zone
- \* Drought tolerant
- \* Tolerant of flooding
- \* Tolerant of air pollution
- \* Tolerant of wind
- \* Salt tolerant

### ■ Exposure

- \* Full shade
- \* Full sun
- \* Part shade
- \* Reflected sun
- \* Acid soil
- \* Alkaline soil

### ■ Soil

- \* Tolerates poor drainage
- \* Requires good drainage
- \* Tolerates poor fertility
- \* Requires good fertility

### ■ Maintenance requirements

- \* Not weedy
- \* Not trashy
- \* Requires no special fertilization
- \* Requires infrequent pruning
- \* Requires regular irrigations
- \* Fire resistant

### ■ Pest resistance

#### Insects

- \* \_\_\_\_\_
- \* \_\_\_\_\_

#### Diseases

- \* \_\_\_\_\_
- \* \_\_\_\_\_

#### Mammals

- \* \_\_\_\_\_
- \* \_\_\_\_\_

## Architectural

### ■ Shape

- \* Rounded (weeping willow)
- \* Vertical oval (ash)
- \* Horizontal oval (mesquite)
- \* Columnar (Italian cypress)
- \* Cone-shaped (pines)
- \* Vase-shaped (acacias)
- \* Mounded (groundcovers)
- \* Flat (lawn)
- \* Climbing (vines)

### ■ Texture of foliage

- \* Fine (hybrid bermuda grass, palo verde)
- \* Coarse (palm, prickly pear)

### ■ Density

- \* Very dense
- \* Open

### ■ Aesthetics

#### Showy and/or colorful

- \* Trunk
- \* Flower
- \* Leaves
- \* Fruit

#### Fragrant

- \* Leaves
- \* Flowers

### ■ Suitability

#### Functional use

- \* \_\_\_\_\_
- \* \_\_\_\_\_

## Special Applications

- \* Street or parking lot (tolerates restricted root zone, low soil oxygen, and heat)
- \* Patio (not weedy or trashy, deciduous to allow winter sun)
- \* Under electrical lines (not more than 20 ft. tall, infrequent pruning)
- \* Oasis planting (tolerates frequent irrigations and probably shade)
- \* Xeriscape (tolerates drought, looks appropriate in desert landscape)
- \* Hedging (small leaves, compact stems, slow growth, non-blooming, evergreen)
- \* Widely available
- \* Relatively uncommon

# DRIP

## IRRIGATION

### THE BASICS

**ROBERT E. CALL**

*Former Extension Agent, Horticulture*

**CADO DAILY**

*Retired Coordinator, Water Resources*

**REVISED BY:**

**URSULA SCHUCH**

*Professor and Specialist, Horticulture*

**Drip irrigation** – also known as low-flow, micro, and trickle irrigation – is the slow, measured application of water through devices called emitters. It is the most efficient way to irrigate. A wide variety of quality products has been developed to make drip irrigation reliable and easy to use for almost any landscape situation.

#### Why should I use drip irrigation?

Drip irrigation saves water because little is lost to runoff or evaporation. This watering method, if implemented correctly, promotes healthy plant growth, controls weed growth, and reduces pest problems.

#### What types of landscapes are best suited for drip irrigation?

Most of your landscape can be watered with drip irrigation except for turf areas. Drip systems are particularly well suited for desert landscapes, places where runoff can be a problem, and small, narrow areas such as entryways.

Drip is also a great way to water vegetable gardens, fruit trees, and potted plants.

There is a wide assortment of equipment to suit most budgets and watering needs.



This micro-tube delivers water to the root zone of the tree. Under ground, it is attached to an emitter connected to a polyethylene tube.



Laser lines are a type of micro-tubing with emitters embedded inside the tube.



This drip emitter is connected to micro-tubing which is attached underground to a lateral line..



Drip tape has emitters inside the tubing and is connected to a polyethylene line. It is used for vegetable gardens or annual flower beds.



## What are the components of a drip irrigation system?

### Controller/ Timer:



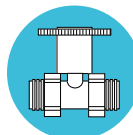
Controllers or timers are also called irrigation clocks. They are programmed to automatically turn on control valves for a specific amount of time and for certain days. This determines how often and for how long the irrigation system is turned on.

### Backflow Preventor:



This prevents water in the irrigation system from flowing back into the potable water supply. Backflow preventers are required for all irrigation systems and installation is regulated by county, municipal, or local codes.

### Valves:



Valves turn the water in the irrigation system on or off. They can be manually or automatically operated and are wired to the irrigation controller.

### Filter:



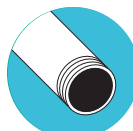
Filters screen particles out of the irrigation lines to maintain a clean water supply. Even small particles can plug the small openings of emitters and restrict or block water flow.

### Pressure Regulator:



Drip systems require low pressure of about 20 psi. A pressure regulator reduces the incoming water pressure which can range from 50 to 75 psi for most water supplies to levels suitable for a drip system.

### Pipe:



Rigid PVC (polyvinyl chloride) pipe and flexible polyethylene tubing are commonly used for lateral irrigation lines. These lines are generally buried in the soil.

### Micro-Tubing:



These lines are also known as '¼ inch' or 'spaghetti' tubing and deliver water from the lateral lines to the emitters or directly to the plant. The length of micro-tubing from the lateral line to the plant should not exceed 5 feet.

### Emitters:



They deliver water to the plants at slow rates, usually at 0.5, 1, 2, or 4 gallons per hour (gph). Emitters are either located at the end of the micro tubing or between the polyethylene tubing and micro-tubing. In drip tape or polyethylene drip lines emitters are located inside the lines spaced at various intervals.

### Flush Valve/ Cap:



Flush caps are attached to the end of each lateral line. They are removed periodically to flush particles and debris from the irrigation laterals.

## Can I design my own drip irrigation system?

Yes, designing your own drip system is not difficult to do, but it does require some careful planning. Make a drawing of the final installation design of your system, and keep it for your records.

- Group plants with similar water requirements such as trees, shrubs, ground covers and turf on separate valves. Know the number of plants for each type and their water requirements.
- Design with consideration to pipe length, size and elevation changes.
- Plan to expand your irrigation system as plants grow. Move emitters out to the edge of the canopy (dripline) where roots will take up water. Evaluate whether you need more emitters or change existing emitters to deliver more water at a faster rate.
- Select quality equipment. Spending a little money up front will save time and money later. Local irrigation suppliers are a good source of advice.

## Can sprinklers be converted to a drip system?

Yes, there are products that can be installed in place of sprinkler heads. Keep in mind that sprinklers and drip emitters apply water at different rates. When converting to a drip system, all sprinklers in the same zone and on the same valve need to be changed. Sprinkler and drip irrigation apply water at different rates and operate under different pressure, requiring separate valves. Drip systems need a pressure reducer and a filter to protect drip emitters from high pressure and clogging.

### Remember...

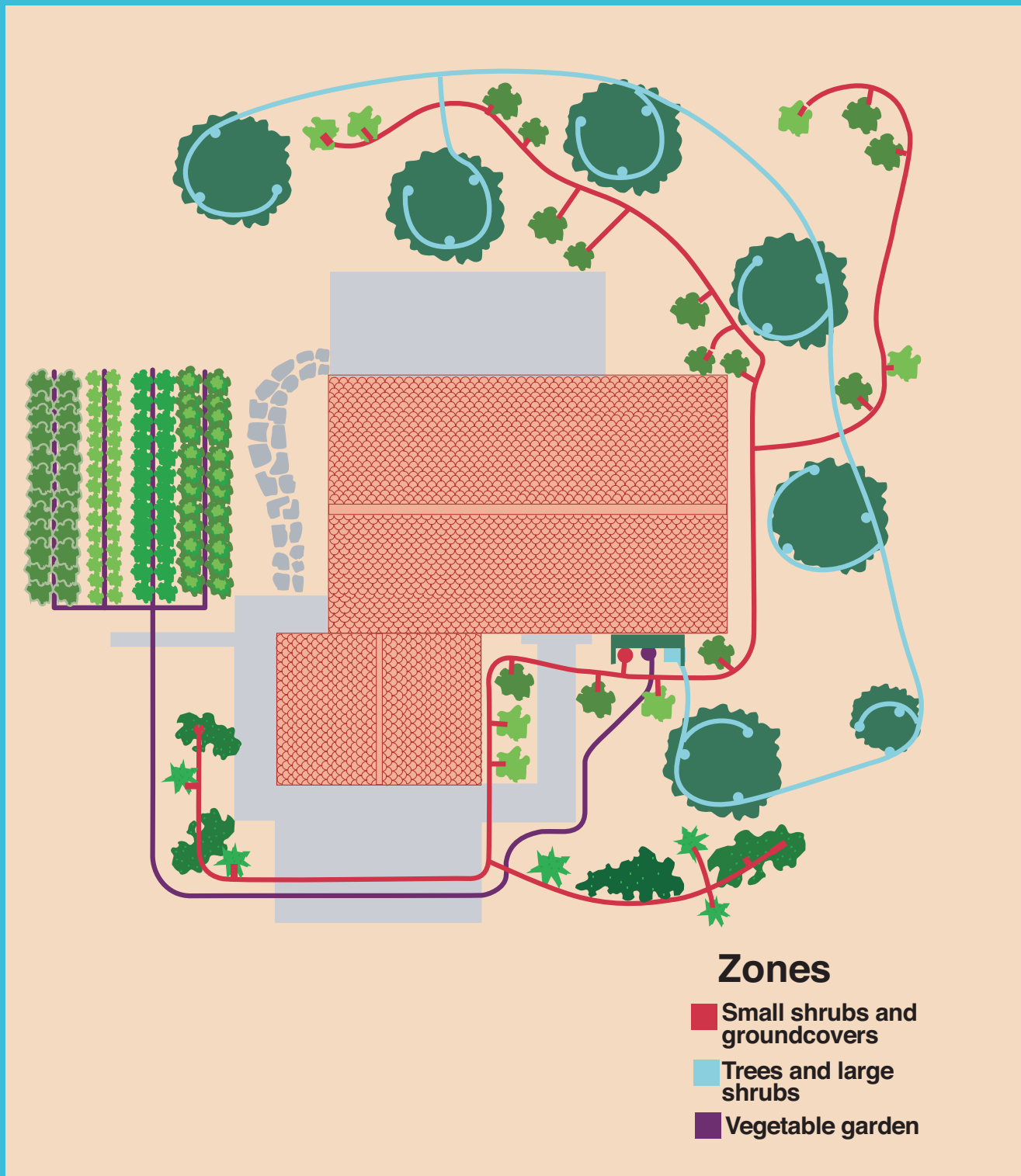
- Follow manufacturer's installation recommendations.
- Set and change watering schedules according to plant water needs, weather and seasons, and soil texture.
- Keep filters clean and flush system periodically.
- Visually inspect emitters and lines monthly to ensure proper water delivery.
- Expand your system as the plants grow.
- Keep good records of your installation design.
- Winterizing your drip system may be necessary in cold areas to prevent freeze damage.

For questions about irrigation or water conservation assistance, contact your local Cooperative Extension Office.

### Resources:

Arizona Landscape Irrigation Guidelines Committee. 2001. Guidelines for Landscape Drip Irrigation Systems. [http://www.amwua.org/pdfs/drip\\_irrigation\\_guide.pdf](http://www.amwua.org/pdfs/drip_irrigation_guide.pdf)

**Adapted with permission from the Arizona Municipal Water Users Association's "Drip Irrigation" brochure.**



This drip irrigation system has three valves for plants with different water needs. Vegetables are watered most frequently with drip tape installed in the bed. Small shrubs and groundcovers have individual drip emitters with low flow rates (0.5 or 1 gph). Trees and large shrubs have multiple emitters with higher flow rates (4 gph) and are watered deep and infrequent.



# CHIA SEEDS

**Alexandra M. Franklin**

Undergraduate Research Assistant, Department of  
Nutritional Sciences,  
University of Arizona

**Nobuko Hongu, Ph.D., M.Ed., R.D.**

Associate Professor, Nutrition & Physical Activity Extension  
Specialist,  
Department of Nutritional Sciences, University of Arizona

Chia seeds have become popular in the health foods market recently, despite the fact that they are actually one of the oldest staples of the Aztec and Mayan diets. Most supermarkets and health food stores sell chia seeds, but they can sometimes be difficult to locate in the store. They can often be found in the produce section or the baking section, however some stores may keep them with their specialty items such as next to the flaxseeds. Consumers are adding chia seeds to baked goods, breads, smoothies, or simply sprinkling on top of salads, cereals, and soups. Because of their mild flavor, chia seeds can be added to a wide variety of dishes. This article can help you learn more about chia seeds, and show you how to incorporate them into a balanced diet.

## What are Chia Seeds?

Chia (*Salvia hispanica* L.) is a desert plant that was cultivated for centuries by the Aztecs of ancient Mexico. Chia seeds were a very important crop of the Aztec people, along with corn, as they incorporated these seeds into their daily diet. *Salvia columbariae*, a slightly different plant than that is grown in ancient Mexico, can be found in California, Nevada, Arizona, and New Mexico.<sup>1,2</sup> The Native American tribes of California used this variation of chia seeds as a source of food and for medicinal purposes. More recently, chia seeds are regaining the spotlight for their suspected nutritional benefits and have even been deemed a superfood.<sup>3</sup>

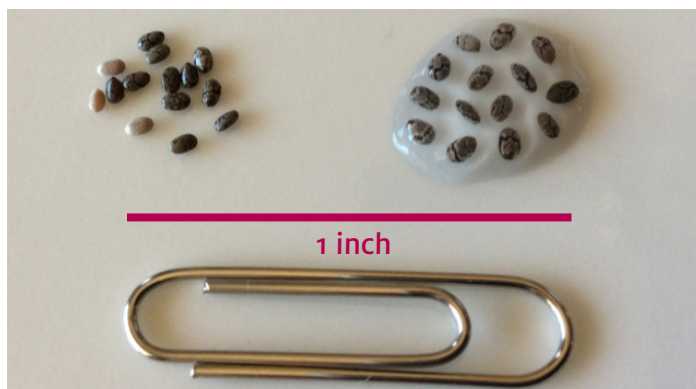


Figure 1. Chia seeds – Added water and allowed to sit for 30 minutes (right).



## Unique Properties of Chia Seeds

When chia seeds are added to water and allowed to sit for 30 minutes, they form a gel. (See Figure 1. Chia seeds) Chia seed gum, a slimy material, begins to form in the solution.<sup>4</sup> The structural component responsible for their gelatinous quality in liquid is the water-soluble fiber of chia seeds. There is much interest in the characteristics of chia seeds and chia seed gum for use as a thickening or emulsifying agent in food products.<sup>5</sup>

## Nutritional Information and Health Benefits

Chia seeds are a rich source of healthy fats, dietary fiber, protein, and several minerals. The total calories in 1 tablespoon of chia seeds is 69 calories. (See Figure 2. Nutrition Facts Label) They also contain a high amount of antioxidants.<sup>6</sup>

### Omega-3 Fatty Acids

Chia seeds are an excellent source of healthy polyunsaturated fats, especially omega-3 fatty acids, which are not made by the body and must be obtained from foods. The three main omega-3 fatty acids are: alpha-linolenic acid (ALA), eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). ALA comes from plants, vegetable oils, nuts and seeds. EPA and DHA come from fish and fish oils. Our body converts ALA to EPA

# Nutrition Facts

Serving Size 1 Tablespoon (14g)  
Servings Per Container 1

Amount Per Serving	
<b>Calories</b> 69	Calories from Fat 36
% Daily Values*	
<b>Total Fat</b> 4g	<b>6%</b>
Saturated Fat 0g	<b>0%</b>
Trans Fat 0g	
<b>Cholesterol</b> 0mg	<b>0%</b>
<b>Potassium</b> 58mg	<b>2%</b>
<b>Sodium</b> 2mg	<b>0%</b>
<b>Total Carbohydrate</b> 6g	<b>2%</b>
Dietary Fiber 5g	<b>20%</b>
Sugars 0g	
<b>Protein</b> 2g	<b>4%</b>
Calcium 9%	• Iron 6%
Thiamin 8%	• Niacin 9%
Phosphorus 17%	• Magnesium 15%
Zinc 8%	• Selenium 14%
Copper 15%	

\*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.

	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2400mg	2400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

and DHA, which have the most potent health benefits (examples: reducing risk factors for heart disease, including high cholesterol and high blood pressure, and important roles in cognition and eyesight).<sup>7</sup>

Chia seeds contain approximately 26–35% oil by weight and have one of the highest known content of ALA.<sup>8</sup> A tablespoon of chia seeds and walnuts contains approximately 2.5g of ALA, compared to ½ cup of tofu containing 0.4 to 0.7g ALA. The American Heart Association recommends consuming two servings of fish (4 ounces/serving) per week, which may provide 1.3–2.7g of ALA and approximately 500 mg of EPA and DHA.<sup>7,9</sup>

### Fiber

One tablespoon of chia seeds provide a total of 5 grams of fiber, which contributes to the heart healthy nature of chia seeds. Soluble fiber, found in chia seeds, dissolves in water and passes through the digestive system more slowly than insoluble fiber. Soluble fiber with a healthy diet may help lower LDL (bad) cholesterol levels without lowering HDL (good) cholesterol.<sup>10</sup>

### Protein

Chia seeds also provide 2 grams of protein per tablespoon, which is 4% of the daily recommended value (based on a 2,000 calorie diet). Protein provides amino acids that help in building and preserving body muscle and tissues. Inadequate protein intake in the United States is rare.

Figure 2. Chia seed Nutrition Facts (based on 1 Tablespoon, raw)  
Reference: USDA, SuperTracker, Food-A-Pedia

### Minerals

Chia seeds are a rich source of several minerals, contributing significantly to the daily-recommended value of several of them. Containing 15% of the daily-recommended value of both magnesium and phosphorus, chia seeds are a good source of electrolytes, which regulate fluid and are important for muscle function. Calcium, typically obtained in the diet through foods like milk and cheese, is quite high in chia seeds. A milk based smoothie with an ounce of chia seeds mixed in would contain nearly 500 milligrams of calcium, about half of a typical adult's calcium needs. (1 ounce of chia seeds provides 180mg of calcium and 1 cup of any type of milk provides 300 mg of calcium.) Stir-fry with some calcium-rich vegetables, such as broccoli, bok choy (leafy Chinese cabbage), beans, and tofu and sprinkling of chia seeds at the end of the cooking could make a half of a daily target of 1,000 mg of calcium in adults. Zinc, a mineral commonly found in meats like beef and pork, is found in moderate amounts in chia seeds, making them a great source for vegetarians or vegans. Zinc plays a role in immune function, protein synthesis, and wound healing.<sup>11</sup> Lastly, iron is found in moderate amounts in chia seeds, yet another nutrient typically found in meats.

### Antioxidants

Recent studies have shown chia seeds are rich in antioxidants (phenolic compounds).<sup>6</sup>

Antioxidants are substances found in foods, which inhibit ("anti-" a process called oxidation ("oxidant") in the body's cells. Oxidation is a chemical reaction that produces free radicals. Free radicals cause destruction of our body's cells and antioxidants stop them. Studies have shown antioxidants reduce the risk of heart disease and cancer.<sup>12</sup>

The phenolic compounds found in chia seeds may decrease the invasiveness of cancer cells and improve the clinical outcomes.<sup>6</sup>

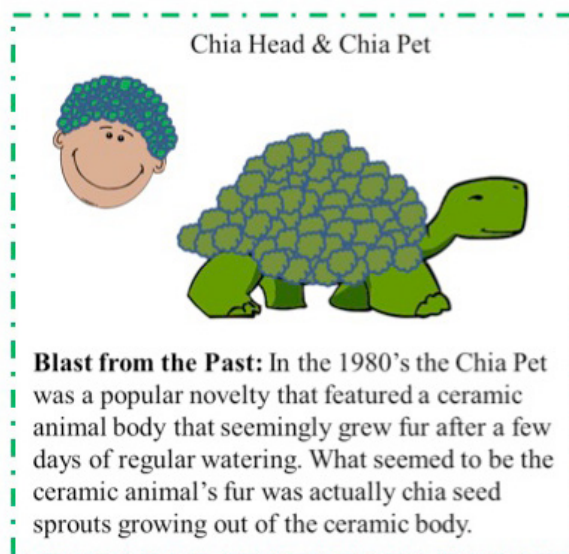
### The Cost

Chia seeds, like olive oil, tend to be on the higher end in price, but a little goes a long way. A 12-ounce bag of chia seeds typically costs about \$9-12, but contains approximately 30 servings, 1 tablespoon each. That means that each serving of chia seeds costs \$0.30-0.40.

### Suggested Uses

It is very simple to add chia seeds to smoothies or juices, which is a great option to boost the nutritional value of your drink. A popular way to consume chia seeds is to simply add them to water with a splash of lemon or lime juice: this is called Chia Fresca (Figure 3. Chia Fresca). Mix 12 ounce cold, drinking water, 2-3 tablespoons of lemon juice, 1-2 teaspoons chia seeds and let it sit for about 5 minutes. Add sweeteners, if you desire. First, make simple syrup – dissolve sugar in boiling water, then add to your Chia Fresca.

There are several ways to incorporate chia seeds into baking, as well, with many recipes available online.





# PRUNING SHRUBS

## IN THE LOW AND MID-ELEVATION DESERTS IN ARIZONA

URSULA K. SCHUCH

Extension Specialist, School of Plant Sciences

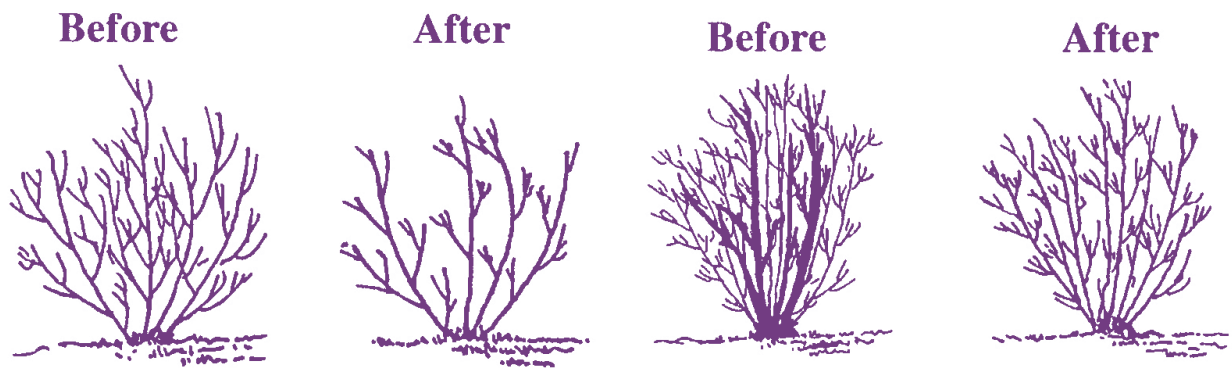


Figure 1. Selective thinning removes the branches back to the point of attachment (left) or to the base of the plant (right) and preserves the natural shape of the plant.

Pruning is the intentional removal of parts of a plant. Pruning needs of shrubs commonly planted in the low and mid-elevation deserts in Arizona vary from no pruning to regular seasonal pruning. Requirements vary by plant species, design intent, and placement in a landscape. Fast growing shrubs generally need frequent pruning from the time of establishment until maturity, while slow growing shrubs require little to none. Pruning should only be done when necessary and at the right time of year. Using the natural growth form of a shrub is a good guide for pruning. Shearing shrubs should be avoided except for maintenance of formal hedges or plant sculptures. All pruning should be done with sharp hand pruners or, for thicker stems, loppers.

### Why prune?

Reasons for pruning shrubs include maintenance of plant health, controlling plant size (for preventing obstruction of a view, sidewalk, or driveway), and rejuvenating old plants. Maintaining plant health includes the removal of diseased, dying, injured and dead branches. Stems that rub against each other should be removed. Control of shrub size for visibility and safety concerns is sometimes necessary. These can be minimized by allowing sufficient space for the plant to reach its mature size in the landscape. Renovating or rejuvenating old or overgrown shrubs through pruning generally improves the structure and quality of the plant, and results in improved displays for flowering shrubs. Some shrubs are grown as formal hedges and require continuous pruning to maintain their size and shape.

### How to prune?

**Selective thinning** refers to removing branches back to the point of attachment to another branch, or to the ground. This type of pruning opens the plant canopy, increasing light and air movement (Figure 1). Thinning cuts do not stimulate excessive new growth. They serve to maintain the natural growth habit of the shrub. When light can penetrate the canopy, entire branches can maintain leaves whereas in a dense canopy branches have leaves near the tip but are bare further back. Selective thinning is suitable for all plants and is generally the most desirable type of pruning cut.

**Heading cuts** remove parts of a stem or branch resulting in multiple new shoots just below the cut (Figure 2). This can create a bushy plant and is sometimes done when plants are very young to stimulate more branches. However, repeated heading is similar to shearing and eventually results in a dense canopy with branches having leaves at the tip and no leaves further back. Heading cuts should only be used for formal hedges, for rejuvenation, or when a cluster of branches is desired. Stubs left by heading cuts will usually die back, unless cut just above a bud.

No pruning or little pruning is required of some slow growing shrubs (Table 1). Such plants are ideal for low maintenance landscapes and include creosote, hop bush, Texas mountain laurel, Arizona rosewood, pomegranate, jojoba, and juniper. These shrubs should be planted where they can reach their natural size without



Figure 2. A heading cut removes part of a branch resulting in multiple new shoots below the cut (left and middle). Leaving stubs should be avoided (right) as they will usually die back.

Table 1. Shrubs for the low and mid-elevation deserts in Arizona that require little or no regular pruning. Light pruning for size control or selective thinning can be done anytime.

Latin Name	Common Name
<i>Buddleja marrubiifolia</i>	Wooly butterfly bush
<i>Dermatophyllum secundiflorum</i>	Texas mountain laurel
<i>Dodonea viscosa</i>	Hop bush
<i>Fallugia paradoxa</i>	Apache plume
<i>Juniperus chinensis</i> cultivars	Juniper
<i>Larrea tridentata</i>	Creosote
<i>Ligustrum japonicum</i>	Waxleaf privet
<i>Nandina domestica</i>	Heavenly bamboo
<i>Pittosporum tobira</i>	Japanese mock orange
<i>Rhus microphylla</i>	Little-leaf sumac
<i>Rhus ovata</i>	Sugar bush
<i>Rhus virens</i>	Evergreen sumac
<i>Ruellia peninsularis</i>	Desert ruellia
<i>Simmondsia chinensis</i>	Jojoba
<i>Thuja</i> cultivars	Arbovitae
<i>Vauquelinia californica</i>	California rosewood
<i>Xylosma congestum</i>	Xylosma



Figure 3. Rejuvenating shrubs that are overgrown starts by cutting them at 12-18 inches above the ground in late winter or early spring. By fall the shrub has grown a full new canopy.

interfering with other plants, structures, or lines of visibility. A yearly inspection can determine whether any corrective pruning is necessary, but generally these species will grow for many years with minimal maintenance.

**Renovating or rejuvenating** older or overly large shrubs extends their life and improves their aesthetic value. One method is to cut all stems about 12-18 inches above the ground. This is a severe measure and changes the appearance drastically (Figure 3). However, when done in spring before bud burst, a great proliferation of stems will grow just below each cut by mid-summer. At that time, about half of the stems should be removed and the remaining ones should be cut back to different heights. Varying the height and cutting just above an outward pointing bud will stimulate growth of new branches out of the canopy. This procedure works well for larger fast growing shrubs like Texas ranger, xylosma, and oleander and for slower growing shrubs like hop bush and creosote. Some shrubs such as cassias, arbovitae and junipers do not respond favorably to this treatment and might die. Rosemary is also not a candidate for this procedure. Thicker stems of older rosemary shrubs without needles should not be cut because they do not initiate new shoots behind the cut. The voids created by cutting woody stems of creeping rosemary will not be filled in by new growth. Several smaller shrubs such as brittle bush, autumn sage, and Mexican honeysuckle benefit from being cut to six inches above the ground annually. They don't require any follow-up thinning of the new growth. Cutting frost-damaged plants back close to the ground after the danger of frost has passed in spring rejuvenates lantana and red bird of paradise. A less severe approach to rejuvenating shrubs is to remove half or more of the older unproductive branches at the base of the plant or those growing into the canopy. This thins out the plant to a much greater extent than regular maintenance pruning. Follow-up care requires removing a portion of the new shoots a couple of weeks later, which might be too numerous and result in an overly dense canopy. The third method of rejuvenation spans three to four years and is less noticeable. About one third to a quarter of the oldest unproductive branches are removed each year. This method requires thinning excess branches and cutting back the remaining new branches as described before.



**Shearing** shrubs entails cutting back branches to a uniform surface. This should not be done other than for formal hedges or special topiaries (Table 2). Shearing shrubs uses heading cuts and leaves stubs which results in proliferation of new dense growth just behind the cut. There are several reasons why shearing is not recommended other than for formal hedges (Figure 4, 5). Shearing is labor intensive and requires repeat shearing to maintain the shape. It destroys the natural growth habit and gives shrubs an unnatural look. It is difficult to control the plant height since the new dense growth shades the inside of the canopy which can defoliate for lack of light. Subsequent cuts into the new growth will shear close to the surface, but over time the dimensions of the canopy will increase. Cutting into the older, bare wood by shearing results in a leafless shrub, limits the plants ability to produce their own food, and depletes their reserves to grow new leaves. This stresses the plant and can result in decline or death. Regular shearing of shrubs removes flower buds, flowers, and destroys their natural form.

## When to prune?

The general guideline for pruning is after flowering shrubs have completed flowering (Table 3). Therefore, spring flowering shrubs like cassia or rosemary should be pruned in late spring. Summer or fall flowering shrubs like oleander, dalea, or Texas ranger should be pruned after flowering or in late winter to early spring. Spring flowering plants complete flower bud formation the previous year, therefore pruning in early spring will remove the current season's flowers. Summer and fall flowering shrubs usually generate flowers on the current season's new growth. They should be pruned either after flowering or before new growth resumes in spring. Selective pruning of a few branches can be done on most plants throughout the year. Some very vigorous growing shrubs like bougainvillea or firethorn need light pruning throughout the growing season, unless they are given ample space to grow naturally.

Frost-damaged plants such as bougainvillea and yellow trumpet flower should be cut back to living wood after all danger of frost has passed or when regrowth resumes. Red bird of paradise is generally cut back to six to ten inches above the ground. Lantana is cut back to just above the ground after frost danger has passed.



Figure 4. Oleander is not well suited for shearing (left). Repeated shearing removes flower buds and flowers, leads to loss of leaves in the canopy and a thin layer of leaves on top. Kept in its natural shape an oleander shrub will flower from spring to fall (right).

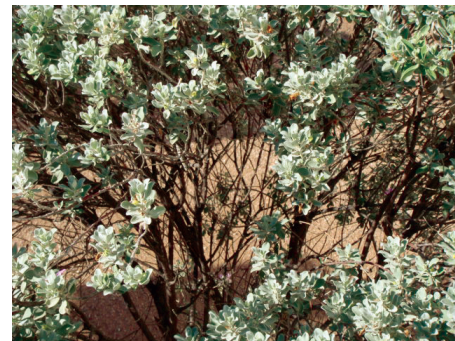


Figure 5. Repeat shearing of Texas ranger stresses the plant and results in a thin layer of leaves on the outer part of the canopy, giving the shrub a transparent appearance.



Figure 6. Japanese or waxleaf privet (left) and xylosma (right) tolerate shearing and are appropriate for formal hedges.

## Hedges

Hedges are used as a screen or in place of a fence. A formal hedge is sheared into a geometric shape by cutting the sides and top. Informal hedges use shrubs in their natural growth habit and maintain the general shape through selective thinning or heading back of individual branches. Plants with small internodes (short distance between leaves) are most suited for hedges which should have

a dense canopy (Table 2). Myrtle, Japanese or waxleaf privet and xylosma tolerate frequent shearing and are good candidates for formal hedges (Figure 6). Oleander, hop bush, heavenly bamboo, pomegranate, and arbovitae cultivars are examples of plants suitable for informal hedges (Table 2, Figure 7). Keeping the mature plant size in mind is an important consideration when choosing a species for an informal hedge. Some oleander cultivars can grow as tall as 20 feet while



Table 2. List of plants suitable for formal and informal hedges in the low or mid-elevation deserts in Arizona.

Latin Name	Common Name	Informal hedges	Formal hedges
<i>Buxus microphylla japonica</i>	Japanese boxwood	+	+
<i>Ligustrum japonicum</i>	Waxleaf privet	+	+
<i>Myrtus communis</i>	Myrtle	+	+
<i>Simmondsia chinensis</i>	Jojoba	+	+
<i>Xylosma congestum</i>	Xylosma	+	+
<i>Juniperus chinensis</i> cultivars	Juniper	+	+
<i>Carissa grandiflora</i>	Natal plum	+	+
<i>Dodonea viscosa</i>	Hop bush	+	
<i>Leucophyllum frutescens</i>	Texas ranger	+	
<i>Leucophyllum laevigatum</i>	Chihuahuan sage	+	
<i>Nandina domestica</i>	Heavenly bamboo	+	
<i>Nerium oleander</i>	Oleander	+	
<i>Punica granatum</i>	Pomegranate	+	
<i>Thuja</i> cultivars	Arbovitae	+	
<i>Vauquelinia californica</i>	California rosewood	+	



the petite varieties will grow only two to three feet tall.

Formal hedges are trained soon after planting. At this time they require cutting off the top third of the plant to induce more branches. The next year half of the new growth is sheared to induce more branching and a full canopy. By the third year hedges are often shaped into the desired form, however this depends on the final size and growth rate of the shrubs used. This might be earlier for low hedges or later for taller ones. The base of a hedge should be slightly wider than the top to allow light to reach the lower branches. Hedges that are kept incorrectly narrower at the bottom than the top will often lose their leaves on the lower branches (Figure 8). The top half of hedges can be rounded, peaked or flat. New shoots that grow out of a formal hedge require follow-up trimming (Figure 9). Formal hedges should be cut only a few inches at a time, otherwise leafless branches may become visible. Maintenance of established hedges usually starts after spring growth is completed. Follow up depends on the species and the level of formality desired. Old, overgrown hedges can be rejuvenated, as discussed before, provided the shrubs respond well to severe cutback. Formal hedges are time consuming to maintain compared to informal hedges, which are allowed to grow in their natural form and need very little maintenance.

## Training large shrubs into small trees

Some shrubs can be trained into small trees. Shrubs that naturally grow to a larger size are suitable for this manipulation. They include Arizona rosewood, Texas olive, Texas mountain laurel, oleander, waxleaf privet, and xylosma (Figure 10, 11). This process should be initiated when shrubs are small and at this time they are trained as either a single trunk or a multi-stem tree. Multi-stem trees are best to accommodate the natural form of large shrubs. For a single trunk tree a straight central leader needs to be selected early. Training is complete when the plant reaches mature size. Regular follow-up maintenance is usually required to keep the trunks free of new adventitious shoots and the base free of suckers. Plants vary in their requirements for selective maintenance. Single stem oleanders demand very frequent removal of sucker growth from the base.

Figure 7. Myrtle (top left), emu bush (top right), hop bush (middle left), jojoba (middle right), heavenly bamboo (lower left) and juniper (lower right) form informal hedges with little maintenance when given enough room to grow to their mature size. Myrtle and jojoba can also be sheared.



Table 3. Pruning recommendations for flowering shrubs commonly planted in the low and mid-elevation deserts in Arizona.

Blooming season	Scientific name	Common name	Pruning
Winter to spring	<i>Eremophila maculata</i>	Emu bush	Prune lightly after flowering as needed.
Spring	<i>Feijoa sellowiana</i>	Pineapple guava	Prune or shape in late spring.
	<i>Encelia farinosa</i>	Brittle bush	From second year on cut back to six inches after flowering.
	<i>Euphorbia rigida</i>	Gopher plant	Remove stems with flowers after fruit have set.
	<i>Jasminum mesnyi</i>	Primrose jasmine	Prune lightly after flowering as needed.
	<i>Pyracantha</i> sp.	Firethorn	Prune after flowering in spring, during the growing season as needed, and in late fall.
	<i>Raphiolepis indica</i>	Indian hawthorn	Light pruning after flowering
	<i>Rosemarinus officinalis</i>	Rosemary	Frequent light pruning as necessary. Plants grow only back from leafy shoots, not from cuts in bare wood.
Spring and summer	<i>Senna artemisioides</i>	Feathery senna	Little pruning required; remove seedpods after they are set, if desired.
	<i>Senna nemophila</i>	Green senna	
	<i>Senna phyllodenia</i>	Silvery Senna	
	<i>Carissa grandiflora</i>	Natal plum	Remove frost damaged wood in early spring and vertical sprouts as needed.
	<i>Dalea greggii</i>	Trailing indigo bush	Cut back by half during winter dormancy first couple of years.
	<i>Punica granatum</i>	Pomegranate	Prune in late winter as needed to shape.
	<i>Salvia clevelandii</i>	Chaparral sage	Cut back old stems in winter or early spring. Deadhead spent flower stems. For vigorous species cut back again after flowering in summer.
	<i>Salvia chamaedryoides</i>	Blue sage	
	<i>Salvia greggii</i>	Autumn sage	
	<i>Salvia leucantha</i>	Mexican bush sage	
Spring to fall	<i>Aloysia gratissima</i>	Beebrush	Shape when dormant, otherwise light pruning as needed.
	<i>Bougainvillea</i> sp.	Bougainvillea	Prune dead wood or frost damage in early spring. Remove vigorous shoots as needed.
	<i>Calliandra californica</i>	Baja fairy duster	Light, natural pruning in late spring after first flowering.
	<i>Calliandra eriophylla</i>	Pink fairy duster	
	<i>Cordia boissieri</i>	Texas olive	Light pruning as needed to shape.
	<i>Cordia parvifolia</i>	Little-leaf cordia	
	<i>Justicia spicigera</i>	Mexican honeysuckle	Little pruning needed. Remove old woody stems to rejuvenate in late fall, and remove frost damage in spring.
	<i>Justicia californica</i>	Chuparosa	
	<i>Lantana</i> sp.	Lantana	Cut to ground after frost danger has passed. Prune anytime to control growth, if necessary.
	<i>Nerium oleander</i>	Oleander	Thin in spring or early summer or after bloom, remove old wood, but don't shear.
Summer to fall	<i>Tecoma stans</i>	Yellow trumpet flower	Prune dead wood in early spring, otherwise light selective thinning as needed.
	<i>Caesalpinia gilliesii</i>	Desert bird of paradise	Major pruning in late winter or early spring; cut stems of <i>C. pulcherrima</i> six inches above ground. Light midsummer pruning to control size, if needed.
	<i>Caesalpinia mexicana</i>	Mexican bird of paradise	
	<i>Caesalpinia pulcherrima</i>	Red bird of paradise	
	<i>Leucophyllum candidum</i>	Violet silverleaf	No pruning needed if planted in appropriate space. Selective pruning in early spring.
Fall	<i>Leucophyllum frutescens</i>	Texas ranger	
	<i>Leucophyllum laevigatum</i>	Chihuahuan sage	
	<i>Thevetia peruviana</i>	Yellow oleander	Prune in early spring, remove frost damaged branches.
Fall	<i>Dalea bicolor</i>	Indigo bush	Prune those vigorous species by one third to half during winter dormant period.
	<i>Dalea lutea</i>		
Fall to spring	<i>Dalea frutescens</i>	Black dalea	Prune in late winter.

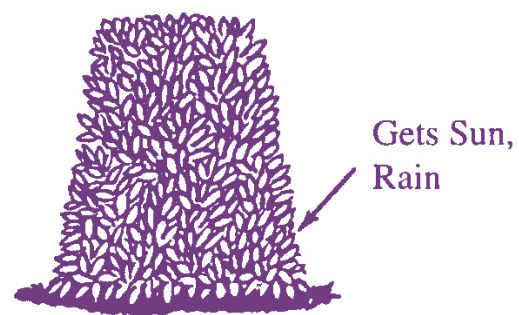


Figure 8. The top of hedges should not be wider than the bottom, which will result in defoliation (left).

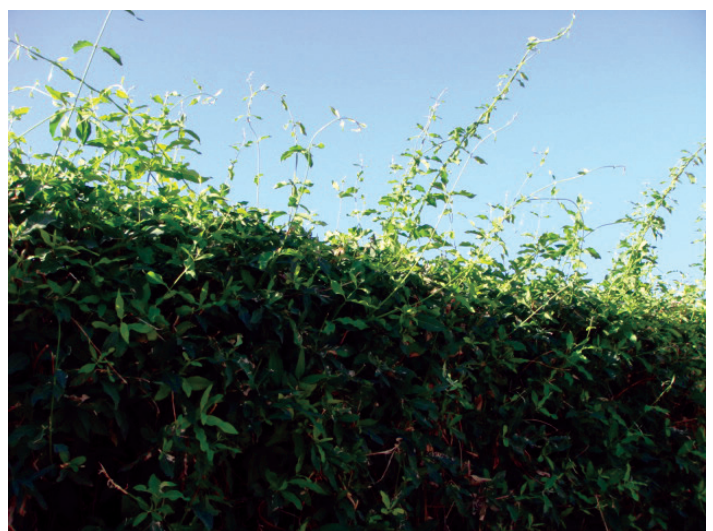


Figure 9. Branches extending the top of a formal hedge are ready to be cut when they extend up to one foot above the desired shape of the hedge.





Figure 10. Texas mountain laurel is a slow growing shrub that can be trained into a small multi-trunk tree.



Figure 11. Texas olive can be grown as a shrub or trained into a tree.

## Literature

- Brenzel, K.N. 2012. The New Sunset Western Garden Book, 9th Ed., Time Home Entertainment Inc., New York, New York.
- Duffield, M.R. and W. Jones. 2001. Plants for Dry Climates. Perseus Publishing, Cambridge, MA.
- Johnson, E.A. 1997. Pruning, Planting, and Care. Ironwood Press, Tucson, AZ.

## Acknowledgements

Photos for Figure 3 were taken by Jack Kelly.



# MOWING TURFGRASSES IN THE DESERT



Figure 1. Reel mower.



Figure 2. Reel mower blades



Figure 3. Rotary mower blade



Figure 4. Rotary mower

**DAVID M. KOPEC**  
*Extension Turfgrass Specialist*

**KAI UMEDA**  
*Area Extension Agent*

Turfgrasses on golf courses, sports fields, or residential lawns are mowed for functionality and aesthetics. Turfgrass mowing height and frequency of mowing are directly related. Fine textured turfgrass varieties that tolerate close mowing (1 inch height or shorter) must be mowed more often than grasses that have wide leaf blades and an upright shoot stature. Mowing turfgrasses at shorter heights within a variety's tolerance range often results in increased shoot density and a narrower leaf blade width (finer texture). Turfgrass that is mowed short grows upright at a faster pace to keep up with the production of new leaves and shoots. Therefore, it needs to be mowed again sooner rather than later when compared to turfgrass that is mowed at a taller height.

Excessive leaf removal causes the plant to be in a very stressed condition. The general rule is to never remove more than one-third ( $\frac{1}{3}$ ) of the height of the lawn at any mowing event. Excessive mowing results in "scalping" that gives the turf a "burned" appearance. Turfgrass that is weakened by stress conditions requires frequent irrigations and becomes susceptible to infestations by weeds, diseases, and insects.

Selecting the proper type of mower is critical for optimal turf maintenance. The general rules for selecting a mower are:

- Use reel type mowers (Figures 1 & 2) for mowing heights of  $\frac{1}{2}$  inches or shorter. Reel type mowers are designed and constructed to give a clean, uniform, and even cut.
- Use rotary mowers (Figures 3 & 4) for heights of  $1\frac{1}{2}$  inches and taller. Rotary mowers can be used on lower maintenance turfgrasses that grow taller and often have an inherently wider leaf blade when mowed less frequently.

Using a mower with dull blades can cause scalping, torn or shredded leaves, and a damaged appearance to the turf. Always keep the blades sharpened and adjusted properly.

Mulching mowers are improved rotary mowers that cut smaller sized clippings that may decompose faster. Clippings should be collected and removed when 1) unusually excessive, 2) the turfgrass is diseased, or 3) weeds are setting flower heads or seeds. Turfgrass clippings contribute very little to the development of thatch. When mowing at the proper mowing height and frequency, clippings left on the turf generally do not cause thatch build up. Excess clumps of clippings left on the lawn will shade and weaken the lawn.

During periods of summer heat stress, raise the height of cut if possible. This provides for more root growth and also provides insulation at the base of the plant where the new shoots emerge. Similarly under shade of trees or on the north side of a building, allow the grass to grow taller and enable it to capture more light.

Avoid mowing wet turfgrasses that tend to ball up and clog mower blades and the deck.

Each species or variety of grass has a base mowing height based on a maintenance level (high, medium, or low maintenance). High maintenance refers to mowing grasses at a low height tolerance, which requires mowing more frequently. Low maintenance turf is mowed taller and less often. For each type of grass, the next mowing event should be when the grass is 33% taller than the base height at the maintenance level selected (Table).



	High Maintenance		Intermediate Maintenance		Low Maintenance	
	Base Ht.*	Mow At:	Base Ht.*	Mow At:	Base Ht.*	Mow At:
Height in inches						
Tifgreen 328 bermudagrass	1/4	1/3	-	-	3/8	1/2
Tifway 419 bermudagrass	1/2	2/3	3/4	1	1	1 1/3
Santa Ana bermudagrass	3/4	1	1 1/2	2	2	2
Midiron bermudagrass (EZ turf)	1	1 1/3	1 1/2	2	2	2 2/3
BOB Sod bermudagrass (MS Choice)	3/8	1/2	-	-	1 1/2	2
Common bermudagrass	1	1 1/3	1 1/2	2	2	2 2/3
Zoysiagrass	1	1 1/3	1 1/2	2	2	2 2/3
Buffalograss	1 1/2	2	2 1/2	3 1/3	3	4
Perennial ryegrass	1/2	2/3	1 1/4	1 2/3	2	2 2/3
Annual ryegrass	1 1/2	2	1 3/4	2 1/3	3	4
St. Augustinegrass	1	1 1/3	1 3/4	2 1/3	2 1/2	3 1/3

\*Multiply the base height by 1.33 to determine the maximum allowable height of the turf before mowing

\*Product names mentioned are registered trademarks. Any products, services, or organizations that are mentioned, shown, or indirectly implied in this publication do not imply endorsement by The University of Arizona.

## Subscribing to Backyards & Beyond is now easier....

Hello to all of our Backyards & Beyond subscribers!

Visit our website to get started:

<http://cals.arizona.edu/backyards> and click on "Subscribe"

The screenshot shows the website interface for 'Backyards & Beyond'. On the left, a navigation menu lists 'Home', 'Archive', 'Subscribe', and 'Index of Articles'. A red arrow points to the 'Subscribe' link, accompanied by the text 'Click here'. The main content area displays the magazine's title, a cover image, and a welcome message: 'Welcome to Backyards & Beyond – Rural Living in Arizona. This informative, concise, and timely quarterly magazine is made for YOU: the small acreage landowner, new landowner or backyard enthusiast.' Below this, a paragraph describes the magazine's purpose: 'As more people make Arizona their home, our traditional farm and ranch lands are being divided into small acreage home lots. Through this publication we aim to provide the education and guidance owners need to successfully manage their resources and care for their property. We will promote sustainable practices that enhance the ecological, economic and social aspects of the land and its people.' At the bottom, it states: 'Funding has been provided by the Renewable Resources Extension Act.'

The Backyards & Beyond Editors & University of Arizona Cooperative Extension

Please contact subscription manager with any questions:  
520-766-3601 or email: [spater@email.arizona.edu](mailto:spater@email.arizona.edu)



DAVID PARSONS



SHARON TEWKSBURY-BLOOM



KARA VAEV



COLLEGE OF AGRICULTURE & LIFE SCIENCES

Cooperative  
Extension