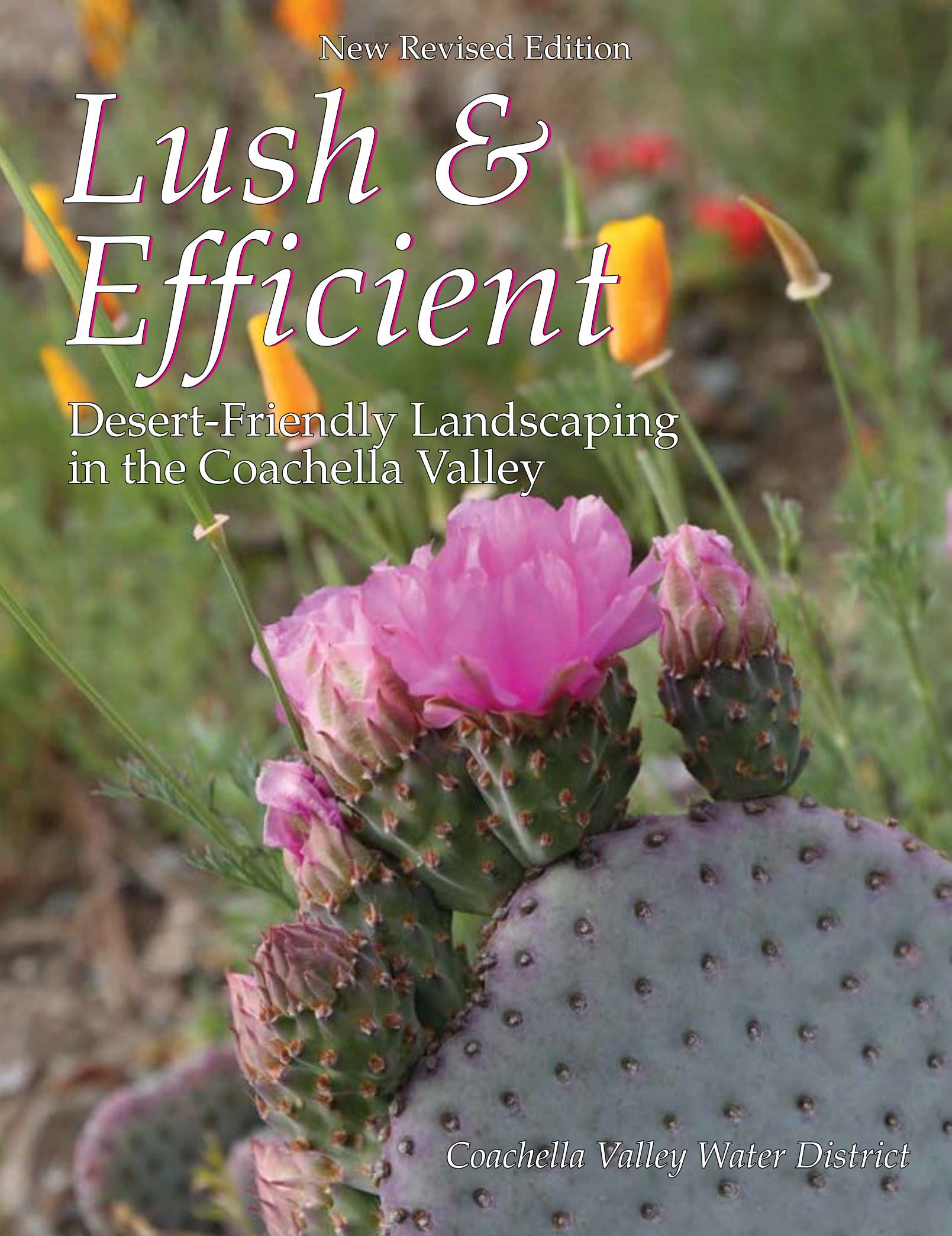
New Revised Edition

# *Lush & Efficient*

## Desert-Friendly Landscaping in the Coachella Valley



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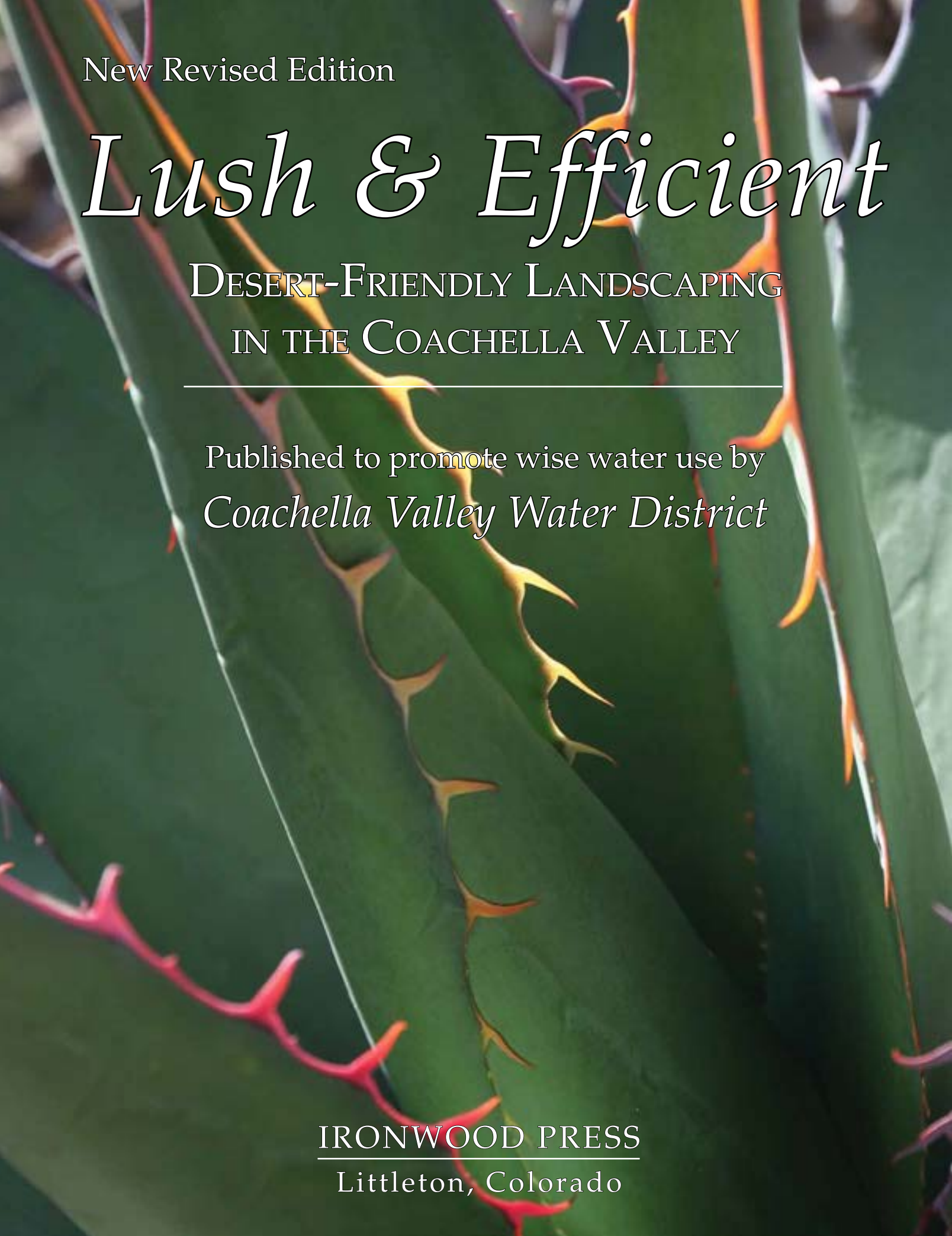

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## Desert-Friendly Landscaping in the Coachella Valley

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*Coachella Valley Water District*

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The Coachella Valley Water District is a public agency governed by a five-member board of directors. The district provides domestic and irrigation water, agricultural drainage, wastewater treatment and reclamation services, regional storm water protection, groundwater management and water conservation. It serves approximately 108,000 residential and business customers across 1,000 square miles, located primarily in Riverside County, but also in portions of Imperial and San Diego counties.





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**Dedication**

This book is dedicated to CVWD Conservation Manager David Koller, PhD, who retired in 2015. Under Dave's leadership, CVWD expanded its commitment to helping the Coachella Valley eliminate water waste through education, one-on-one assistance and numerous rebate and incentive programs. He was integral in the development of water-budget based tiered rates and creating all the rebate and incentive programs in place today. In addition to being a leader, Dave is an expert in his field with a Master of Science degree in Horticulture and a PhD in Business Administration. He is also a certified landscape irrigation auditor and arborist. Dave's commitment to conservation and excellent customer service helped create one of the most robust Water Management Programs in the state.

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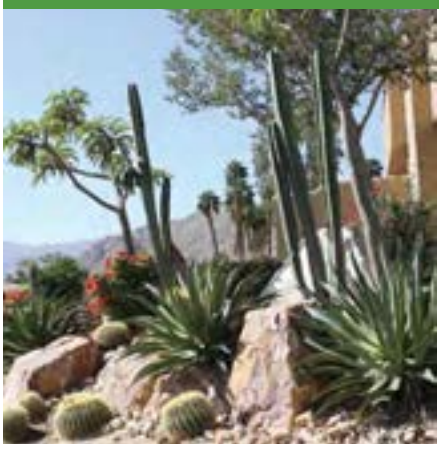


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# The Desert Gardening Difference

Contrary to the image of a desert landscape consisting only of cacti, rocks and gravel, desert gardens can be lush *and* water-efficient. Many native and introduced dry-climate trees, shrubs, vines, groundcovers and perennials have lush foliage, distinctive forms and showy flowers. In fact, a great many plants native to desert regions around the world provide more color and interest over longer periods than their introduced tropical or subtropical counterparts.

This book offers an alternative to traditional, high-water, high-maintenance landscapes in the Coachella Valley. New plants, practical yet beautiful designs and sound irrigation methods provide promise for area homeowners. The permanent resident can plan and plant for year-round enjoyment; the seasonal visitor can create gardens that bloom for selected months during winter and spring.

Looking to the past, many traditional and popular plants were high water users with soft tissues that require regular moisture to survive. Due to the high temperatures and usual low humidity of Coachella Valley summers, few introduced plants of this kind can survive without copious amounts of water, as well as shelter from summer sun and wind.

Water-efficient natives and many introduced plants indigenous to low rainfall areas of the United States, Australia, Africa and the Mediterranean region can be grown with success in the Coachella Valley. Select from more than 350 of these adapted plants in the chapter, *Desert-Friendly Plants*. The great majority of these plants have the proven ability to survive on little moisture after they have lived a year or two in the garden.

It may come as a surprise that overwatering is a serious problem. A fine line exists between the correct amount and excessive moisture. Although newly planted plants need regular attention to water needs, it is helpful to keep established plants on the dry side. Slow, deeply penetrating irrigations encourage deep and well-established roots. Plants become less dependent when they are conditioned to tolerate extreme heat, drying winds and cold.

## The Economics of Landscape Water Use

Most of a homeowner's water use can be traced to outdoor use rather than use indoors. In fact, it's estimated that up to 80 percent of urban water consumption in the Coachella Valley occurs outside the house.

To reduce water bills, some have opted for a "minimalist" landscape—a few cacti adorning decorative gravel. Others, recognizing the physical and psychological cooling effects of a lush landscape, plant a tropical paradise. Unfortunately, these landscapes require huge volumes of water just to keep plants alive through Coachella Valley's scorching summers.

The bottom line? Gardeners can have the best of both worlds—lush plantings that thrive with an efficient irrigation program. The formula includes selecting water-efficient plants, grouping plants of similar water needs and proper installation and maintenance of an up-to-date irrigation system.

Left: This City of Palm Desert landscape uses little water, yet offers tremendous interest and color due to its use of native and adapted plants—all which thrive in our desert climate. Shown are golden barrel cactus, *Echinocactus grusonii,* octopus agave, *Agave vilmoriniana*, vertical-growing Mexican fencepost, *Pachycereus marginatus*, and Madagascar palm, *Pachypodium lamerei*, at far left.
Above: *Agave* 'Blue Glow' provides a striking sculptural element, enhanced by its sword-shaped, blue-green leaves, which "glow" when they are backlit by the sun.

The Coachella Valley is home to a wide range of climate and soil conditions. Every landscape is different, even compared to your neighbors. Get to know the "lay of the land" of your landscape, and select and locate plants adapted to your unique gardening conditions.

## Ingredients of a Desert Garden

### High Heat

When summer temperatures reach 90°F to 120°F and humidity is low, the toll on young plants can be severe in a number of ways.

Temperatures in the upper layer of soil can increase, quickly killing the tender, shallow roots of new plants, particularly annuals and perennials. Signs are brown leaf edges and wilting of new growth. In areas of sandy, rapid-draining soils, plants suffer due to rapid drainage of moisture away from the root area.

High heat is most stressful on plants grown in nurseries located in more temperate climates such as along the coast, then brought inland to the desert. The sun's intensity and reflected heat adds to the stress, especially in a western exposure during summer. Details on how to develop a landscape that creates shade to reduce energy costs is described on pages 8 to 11.

### Cold Temperatures

Frosts in the Coachella Valley generally occur more frequently in lower elevations on clear and windless nights. Dry air temperatures drop about one degree for every 350 feet decrease in elevation. Cold air draining down mountain slopes usually settles in washes and in low pockets. One sign of a potential for frost is when temperatures drop to 50 degrees before 9 p.m. when the sky is clear and there is no wind. Average date for the first killing frost in the Coachella Valley is November 21, with the last frost around March 15.

During periods of low temperatures, tender plants can be protected by covering root areas with 2 to 3 inches of an organic mulch such as bark or aged, composted manures. Move cold-tender plants in containers under the shelter of a wide overhang, patio or beneath canopy-shaped trees.

When selecting plants, be aware of their inherent hardiness to cold. The amount of cold each plant described in this book will tolerate is provided on pages 42 to 131. One of the best methods of learning which plants are cold hardy enough to use in your landscape is simple: Take note and identify the established, healthy plants in older gardens in the surrounding area.

### Wind

The flow of winds and accompanying movement of sand is one of the most trying experiences for gardeners in the Coachella Valley. Plants can help curtail the bite of wind and sand in the form of dense windbreaks (see list, page 11).

Windbreak plants must be tall enough to slow the wind's force. Wind patterns coming through San Gorgonio Pass fluctuate with westerly storms and

Cold-tender plants will suffer frost damage certain years when temperatures drop and remain below freezing for a period of time. Wait until new growth appears the following spring before removing dead or damaged stems or branches.

Mulches are a gardener's best friend in the Coachella Valley. Applying a 2- to 3-inch layer of organic mulch such as ground bark will insulate plant roots from the heat and cold, and slow moisture loss in the upper layers of soil.

coastal fogs and are most prevalent during late winter and spring months. Dust and sand begin to move when the wind reaches 15 miles per hour (mph) or more. Mild dust storms may develop at 20 mph. Severe sand storms, which can create havoc with windshields, paint, people and plants, usually develop at 30 mph or more.

Local winds contrary to the westerly flow often are stirred by the development of low-pressure areas in the lower desert, or they are brought in by tropical *chubascos*, storms originating off the west coast of Mexico or southwest of San Diego.

If winds are common in your area, locate landscape plants with the wind factor in mind. In general, windbreaks should be sited perpendicular to prevailing winds. Fortunately, the flow of sand decreases with each new development, which helps anchor sand dunes. Walls, fences, hedges, lawns, gravel and groundcovers also reduce the problem.

### Soils in the Coachella Valley

Experienced dry-climate gardeners realize the importance of managing soil, water and plants successfully. Fortunately, valley soils are easy to make more productive. In upland and eroded areas of the valley, soils are shallow and require more work to become acceptable for plant growth.

Caliche, also called *hardpan*, is a cementlike layer of calcium carbonate that accumulates below the soil surface. It can reach a thickness of a few inches to several feet. If a gardener's shovel bounces back when it strikes the soil, test for caliche. Pour vinegar onto the soil. If it bubbles, it is caliche.

Soils in the Coachella Valley can be divided into definite categories. Areas west of Palm Canyon Drive and south of Highway 111 in Palm Desert are sandy to rocky due to the area's alluvial structure. In some coves, wind-blown sand covers much of the ground. East of Palm Canyon Drive and north of Highway 111, most soils are predominantly sandy. In all instances, drainage of moisture is usually adequate.

Slow-draining soils can be found in La Quinta and points south. Here, gardeners must break through layers of silt or clay before water can drain. Silt-laden sand builds up a crust that practically seals itself when water is applied. Commercially available soil penetrants made of sulfur compounds can be effective in combating this problem. Digging extra-wide planting

#### *In a Desert-Friendly Garden*

Even tough native plants require regular irrigation when they are first planted. It may take up to two summers before they are considered established. Fast-draining soils and frequent drying winds cause new plants to dry out quickly, so pay special attention to their moisture needs during these times.

In many parts of the valley, soils are almost pure sand, requiring frequent irrigations to provide sufficient moisture to plants.

Mixed thoroughly into the soil, organic materials retain moisture and provide roots with a better growing environment. Plants growing in close proximity to one another such as vegetables, annuals and garden perennials benefit most.

holes and setting plants a bit higher when planting allows moisture to drain away from the plant's crown. These methods are necessary in La Quinta and some lower elevation regions.

### Organic Materials: Mulches and Additives

The addition of organic materials such as ground bark, composted manures and planter mixes aid desert soils. Mixed thoroughly into the soil, these materials retain moisture, aerate clay soils and provide roots with an improved growing environment.

Mulching and additives can prevent soil crusting, curtail weed growth, reduce need for cultivation, reduce water use and lower soil temperatures. Materials generally available include packaged composted ground bark and composted sawdust. In extremely windy areas, adding a layer of gravel helps hold the mulch in place.

Working soil additives into planting beds makes sand and loam soils better at retaining water. Soil around new plants should be blended well with existing soil. You must add enough material to substantially change the soil's composition. Prepare soil a few weeks before planting to allow additives to incorporate into existing soils.

The pH of desert soils is often alkaline, caused by an accumulation of sodium and calcium. Due to low rainfall, these two elements don't adequately leach, or wash away, when soils are heavy. Fertilizer such as ammonium sulfate or soil sulfur, worked thoroughly into the soil, helps lower the pH, typically to 7.2. If soils have good drainage, watering slow and deep also helps alleviate the problem.

Salinity, or salts, can be a problem in heavy soils if rainfall is too scarce to move salts down and away from plant roots. Farmers flood fields to leach salts into underground drains. Adding iron sulfate or soil sulfur to planting areas can help combat salt buildup.

Many desert areas on alluvial slopes, areas of young, rocky soils at the base of mountains, have deep strata of decomposed granite, commonly referred to "D.G." Decomposed granite, available from landscape supply companies, is also a commonly used inorganic groundcover. These soils have been created by extreme water action of storms and the resulting runoff. Drainage is rapid. Plant roots grow well in such soils if given adequate moisture. However, when dry, alluvial soil is difficult to work. Mixing in soil additives and adding water to soil before digging and planting can help.

## Landscaping for Climate Control

When you live in a hot desert climate such as that of the Coachella Valley, you probably spend more money to cool your home than to heat it. And, as mentioned, outdoor water use can be as much as 80 percent of residential water consumption. Energy and water prices have been increasing and are likely to continue, prompting residents throughout the Southwest to explore ways to conserve both.

Shading air-conditioning units can reduce their workload, making them more energy-efficient. These shrubs are hop bush, *Dodonaea viscosa*.

Trees and shrubs strategically located around buildings dramatically reduce cooling costs. This velvet mesquite, *Prosopis velutina,* provides welcome shade to the western exposure of this home.

## How Plants Modify Climate

Everyone has felt the immediate drop in temperature when you walk beneath the shade of a dense tree on a hot summer day. Trees, shrubs and groundcovers can greatly reduce cooling loads of buildings in hot, arid climates by modifying air temperatures and solar heat gain.

You can design or retrofit a landscape to help reduce cooling costs. Locating trees, shrubs and vines so they will shade roofs, walls and windows will effectively lower the energy required to cool the interior.

Plants also cool air around homes through the process of *evapotranspiration*. This is the evaporation of moisture at the leaf surface, which cools the air around the leaf. Research has shown that trees and shrubs placed in key locations around a home can reduce cooling requirements up to 24 percent. A mature, wide-canopy shade tree placed to shade the south and west walls and roof of a home can cut cooling costs as much or more.

Understand where the sun is in the sky when temperatures are at their hottest. The goal is to position plants so they will block the sun's rays. The path of the sun during summer is much higher than it is during winter. This means that summer sunshine tends to warm the east and west walls, as well as the roof. Winter sunlight strikes mostly south-facing walls.

**Trees—**Trees provide direct shade for outdoor spaces, walls, windows and the roof area of a home. The choice of tree types for summer shade could be either *evergreen*, which means trees remain in leaf all year, or plants that are *deciduous*, when leaves drop and branches are bare in winter. In colder regions, it's a benefit to use deciduous trees. The bare branches during winter allow warming sunlight to reach walls and windows.

**Groundcovers—**Plants that spread to cover the ground decrease heat around a structure and reflected sunlight on walls and windows, which reduces cooling costs. In place of a sea of rock or gravel, a landscape composed of groundcovers, a small lawn and shrubs will greatly reduce heat gain around a home. The benefit of this cooling often outweighs the additional cost of water to establish and maintain the plants.

## Windbreaks and Hedges Help Control Climate

Windbreaks have long been a part of the history of the Coachella Valley. In the past several decades, thousands of acres of orchards, date groves, vineyards, vegetable crops and small villages were developed, from Palm Springs to the Salton Sea. Windbreaks of many kinds were planted to reduce the force of wind and blowing sand. For example, without the blow-sand control provided by the rows of windbreaks planted by Southern Pacific, railroad tracks would be quickly covered by sand dunes.

Development in the Coachella Valley continues to claim large acreages of sand dunes up to and across Interstate 10. The need to control blowing sand and dust becomes even more important as regulations for clean air controls are implemented.

**Windbreak Basics—**Consider the intensity of the afternoon sun, heat and direction of wind when you

locate trees and hedges for windbreaks, hedges and screens. One clue is to notice how plants are shaped (leaning) due to prevailing wind patterns.

Divert wind with height and density. Tall trees—to 40 feet or more high—can reduce wind velocity as much as 50 to 200 yards downwind. Study existing windbreaks in your area that are effective in helping control and divert wind. How are they placed, and which plants are being grown? What is the spacing between plants?

Multiple-trunk trees generally maintain better vertical growth under the stress of wind. Even with dense foliage, certain pines and cypress withstand heavy or constant winds with a rugged persistence.

All windbreak trees must have deep irrigation to survive. Drip irrigation has proven to be ideal in helping trees develop deep roots at the plant's *drip line*, an imaginary zone where rainfall would drip off the outside edges of leaves and branches. (See page 153.)

A triangulated pattern with 12- to 18-foot spacing of trees, with lower ground level 10- to 12-foot shrubs and conifers with great density, can create a strong barrier against wind.

## Grouping Plants by Sun and Water Need

Plants that are efficient users of water employ many tricks to stay alive. Some go dormant in the summer. Others have modified leaves that conserve available moisture by being thick, waxy, leathery, fuzzy or hairy. Other plants have green trunks and branches that carry out photosynthesis even if leaves drop. Still others have well developed, deep root systems designed to absorb available moisture. Some have seasonal adaptations. For a basic example, deciduous plants usually require more water in summer, but survive on much less water in winter.

Often, a plant's water needs change as they begin to mature. Many fast-growing young plants require a lot of water the first few years. As growth slows with age and plants develop a deep root system, they may require only occasional deep watering.

Because a plant is native does not mean that it uses little water. Some plants native to riparian (streamside) ecosystems, such as cottonwoods, are high water users with aggressive roots.

Strong gusty winds are common in the Coachella Valley. If trees will not stand upright on their own, stake to protect them and ensure their correct growth. As shown, this young tree is double-staked—supported on both sides. Straps are not too tight, allowing trunk to move on its own to gain strength. Position stakes so they will be perpendicular (at a right angle) to prevailing winds.

Trees such as this hybrid mesquite, *Prosopis* species, grow quite rapidly and produce wide canopies, which can catch the wind umbrella-style. Lightly thin the interior branches of young trees (do not top!) and apply water wide and deep to develop the support of a wide-spreading root system.

**Trees and Shrubs for Windbreaks**

*Acacia aneura*, Mulga Acacia
*Cupressus arizonica,* Arizona Cypress
*Cupressus glabra* 'Gareei', Rough Bark Cypress
*Eucalyptus microtheca*, Coolibah Tree
*Eucalyptus spathulata*, Swamp Malee
*Pinus eldarica,* Afghan Pine
*Pinus pinea,* Italian Stone Pine
*Rhus lancea,* African Sumac

## Matching the Plant with the Exposure, The Exposure with the Plant

Plants are born with inherent tolerances to light and heat. You'll notice that many of the plants recommended in this book prefer some shade in the afternoon. When you decide on a location where you want to grow plants, gain an understanding of the exposure—*north, south, east* or *west*—and select plants that accept the growing conditions in each. This method usually works better than buying a plant you like and trying to find a proper exposure to match.

Here are the common exposures and the conditions they present to plants:

**South and West—**The west exposure features intense afternoon sun, so is by far the most difficult growing location. During the long summer months the searing heat is just too much for many plants. A south location does have the benefit of being warm in winter, receiving sunshine during all seasons. Only sun- and heat-loving plants will thrive when planted in a south or west exposure.

These two photos are the same windbreak near Indio, taken 7-1/2 years apart. In the top photo, screening was used the first few years after planting to protect citrus until trees attained sufficient size.

**East—**The east side of a building or wall is usually the ideal exposure for most sun-loving plants. Many plants may tolerate the heat, yet are easily burned by direct, afternoon sun. Such plants will thrive along the east side of a structure, where forgiving shade is cast during the afternoon. Plants that tolerate some shade also belong in this exposure.

**North—**The north side must be used for shade-loving plants, but during midsummer months, it, too, receives some sun. Certain plants in this north exposure may need protection from the afternoon or morning sun during this seasonal period. Plants with limited heat tolerance belong on the north side of structures or trees. When working with this plant group, be aware of reflected heat and sunlight from adjacent sidewalks, driveways, streets, masonry walls or pools.

Expand planting areas for the most sensitive plants by taking advantage of shade from trees and structures. The filtered shade of a canopy-forming tree

These flowering plants combine nicely for their eye-catching color, and also have the same water needs. See "Hydrozoning: Grouping Plants by Water Use," page 12. Hydrozoning is important if irrigating plants with a drip system. Shown are purple moss verbena, *Glandularia pulchella,* and golden dyssodia, *Thymophylla pentachaeta* var. *pentachaeta.*

## *In a Desert-Friendly Garden*

**When shopping for plants, consider these factors:**

- ❑ Height and width at 5 years, 10 years and maturity
- ❑ Rate of growth: slow, moderate, fast
- ❑ Flowering habit, bloom period
- ❑ Foliage type: coarse, medium, fine
- ❑ Water requirement: low, moderate, high
- ❑ Nutrient needs: native plants require minimum
- ❑ Preferred soil type and soil drainage requirement
- ❑ Exposure: reflected sun, sun, filtered shade, shade
- ❑ Hardiness to cold
- ❑ Heat and sun tolerance
- ❑ Relationship to other plants: "plant partnerships"
- ❑ Ideal planting season

(acacias, mesquites, palo verdes) offers an ideal home for plants prone to sunburn. This is especially true if they are in containers, which eliminates the problem of roots competing for moisture. Also, sensitive, cold-tender plants grown in containers can be moved in and out of protected locations as the seasons change.

### Hydrozoning: Grouping Plants by Water Use

Grouping plants according to their moisture needs is called *hydrozoning*. This helps in the design and application of drip-irrigation systems. Plants with the highest water use should be closest to the area where you spend the most time outdoors, such as spaces near patios and at home entrances. This high-water zone is the prime location for annuals, luxuriant, water-thirsty subtropicals and other high-water-use plants.

Vigorous, unfussy but attractive shrubs and trees, such as the Texas rangers, acacias and mesquites, are prime candidates for the moderate-water zone.

*Microclimates* are the small climates around your home. Use them to your advantage. This protected spot is an ideal location for cold-tender plants.

Both golden barrel cactus, *Echinocactus grusonii,* and grass tree, *Dasylirion longissimum,* accept a full sun exposure and are low-water-use plants. Their striking forms and textures are quite dramatic when used in combination.

A canopy-shaped tree provides some beneficial planting opportunities beneath it. These agaves are thriving in this partial shade exposure.

## Planting Step by Step

1. Plant as soon as possible after purchasing to prevent drying out of the rootball. It is best to dig planting holes before buying plants. Prior to planting, water the container well to ensure the soil is moist. Remove the plant from the container. If plastic, turn upside down and knock the edge against a hard surface to gently slip the rootball out. Handle plant carefully by its rootball, not by the stem, to avoid injuring the roots.

2. Dig holes for plants so they are at least three times wider than the rootball. It helps root growth if the ground is loosened beyond a plant's drip line, the area near the perimeter where rainfall will naturally drip off the plant to the ground. Fill hole with water to moisten the surrounding soil before planting. If water does not drain in an hour or two, dig deeper for more adequate drainage or select another planting site.

3. Place rootball in planting hole and add soil, firming it around the rootball. Water plant and add soil around the sides to eliminate air pockets. After soil settles, add more soil so that it reaches the top or just below the rootball.

4. Use soil to build a basin around the perimeter of the rootball. Extend to about three times the size of the rootball. Make the basin high enough so it will hold at least 3 inches of water. If planting a tree that needs support to stand on its own, supply two stakes, and tie them loosely to tree as shown above. See photos, page 10.

In dry climates, the low-water zone is often farthest from the house and water supply. Plants are not usually viewed close up. They can have coarser textures, and naturally do not need as much water. Plants known to provide shelter and food for wildlife are ideal here. Examples are low-maintenance shrubs such as desert hackberry, four-wing saltbush and wolfberry.

## Pruning by the Seasons

Through all seasons in the Coachella Valley, plants have a greater vitality when given regular care and supplied with adequate moisture. Proper pruning, shaping, thinning and dead-heading flowers are important regular aspects of plant maintenance—more important than many gardeners realize. When you prune, you are directing plant growth.

### Some Pruning Basics

Poor pruning practices are often perpetuated by a lack of knowledge about the growth habits of plants and flowering periods. Contributing to the problem is the overplanting of many new gardens, done to achieve an immediate mature effect.

Good pruning and control techniques begin with plant selection. Consider the rate of growth and mature size; plant form and texture; location related to sun, shade and soil type; flowering habit and spacing for height and width; and proximity to structures, walks and pedestrian traffic areas.

Follow these guidelines to help gain an understanding of this most-misunderstood gardening practice.

- ❑ Prune most cold-hardy plants in late fall to early winter. Cold-tender subtropical and tropical plants respond better when pruned in late spring and early summer.
- ❑ Remove broken, diseased or dead wood from trees and shrubs any time.
- ❑ Remove crowded stems and weak growth to help plants develop balanced structure and form.
- ❑ Naturalistic pruning—light, selective removal of branches and limbs, allows plants to grow as nature intended. Plants sheared as hedges or geometric shapes are robbed of their individuality, flowers and natural beauty.
- ❑ When removing stems and branches, cut stubs close to a main stem or branch to aid healing.
- ❑ Nip tips of new growth to increase bushiness.
- ❑ Thin fast-growing trees such as acacias, elm, eucalyptus, mesquite, palo verde and bottlebrush to reduce the possibility of wind damage.
- ❑ Remove sucker growth on trees to prevent branch growth in the wrong locations. Pull, rather than cut, for best results.
- ❑ Pruning tools work much better when you keep the blades sharp. Be sure to use the right size pruning tool for the job.

This sign at a California botanic garden is a reminder before you reach for saw, lopper or shears. It is often better to leave plants alone to grow as nature intended.

Removing small weak branches improves the health and appearance of trees and shrubs. If possible, do major pruning during the dormant season when plants are not actively growing.

Be careful when pruning, especially when working with young plants. A hasty job such as this destroys the plant's form and can even cause its death.

- Better plant shape and regrowth develops when plants are pruned gradually over a period of time compared to heavy pruning once each year. As a rule, remove no more than 20 percent of the plant's foliage at any one time to avoid stress and sunburn of trunk and branches.
- Plants are forgiving and have a natural ability to recover from poor pruning. It is seldom too late to correct past pruning errors. You can improve their appearance over time with patience and proper care.

### Topping Trees: The Best Advice is, Don't!

Tree topping, also called *heading*, refers to the removal of major portions of the tree's crown by cutting branches to stubs or to the main trunk. This type of negative pruning is most conspicuous on eucalyptus and mesquite trees.

This mutilation results in clusters of new stem growth emerging below the stub cuts, creating excessive, small, weak branches that later become vulnerable to breakage. The new growth can increase wind resistance, as the mass of branches becomes a "sail" in the wind. If your tree catches sail, the end result can be total loss of the tree. On a small scale, topping creates openings for invasion of rotting organisms. Stubbing branches also upsets the entire growth pattern of the tree. Over a period of time, the tree will generally decline in health, beauty and effectiveness, and even decrease its monetary value by 20 to 50 percent.

Do not top trees. It ruins the tree's form, shortens its life and may cause it to become a hazard.

### The Irrigation and Pruning Connection

The relationship of irrigation and pruning is a close one. The amount of water applied directly affects the amount of pruning needed. Overwater, and growth can be too lush and succulent. *Underwater,* and plants become stressed, reducing healthy growth and inviting attacks from pests and diseases.

Deep watering at the plant's drip line places moisture deep in the root zone. It can be provided by an irrigation schedule that takes into account the size of a plant and its root system. Trees in turf areas without drips or bubblers often have problems related to surface roots, and lack deep roots to provide stability and resistance to heavy winds. Water slow and deep to help prevent.

## Fertilizing Plants

In many parts of the Coachella Valley, sandy soils and rock-and-sand soil combinations are common. They have excellent drainage, but tremendous amounts of water must be applied frequently to keep plants alive when temperatures soar. Rapid soil drainage and frequent irrigation *leaches* (washes) plant nutrients, particularly nitrogen, away from plant roots. This results in a need to replenish these nutrients more often.

Because of the rapid leaching of nutrients from the root zone, it is best to apply fertilizers more often and in smaller doses.

Topped trees typically send out a profusion of weak branches once primary branches are removed. Not only does this make for an ugly tree, its health is severely compromised.

The availability of fertilizers packaged for specific plant types and uses reduces the need to do your own mixing of nutrients. Commercially available citrus food, rose food, palm food and lawn fertilizer help make fertilization programs simple.

After many years of testing in commercial projects and in nursery growing operations, slow-release fertilizers have become useful products for the home gardener. They can be added safely to the soil mix at planting time in close proximity to plant roots. They provide proper nutrients over many months, reducing time and expense, while improving plant growth.

Liquid organic fertilizers are easy to use. The reaction period is fast and safe, and they can be applied more often. Groundcover plantings and newly planted annuals and perennials respond favorably to liquid fertilizers. As with all fertilizer products, read and follow product labels carefully.

### Fertilizing According to Plant Type

New plantings of shrubs and trees will accept a well-balanced application of organic plant food by the second or third month after planting. Continue applications monthly through summer. Citrus trees maintain a good growth pattern when fertilizers are applied regularly from February to the first part of September. Roses need a steady diet of nutrients from early spring into late fall, based on their bloom cycle. It is helpful to remember that when roses complete a bloom period, it's time to apply a balanced rose food.

Deep-rooted trees can require deep applications of nutrients. Dig holes 12 to 18 inches deep into the soil around the drip line. Place three or four slow-release tablets in the holes. Follow with a deep irrigation.

Use drip irrigation or allow a hose to drip slowly into the soil to deliver water deep into the plant's root zone.

Annuals, perennials and groundcovers typically have shallow roots, so pelletized types of fertilizer are safest to apply. Neglecting fertilizer applications can slow growth to the point where plants become stunted.

Lawns respond with vigorous growth when given high nitrogen fertilizers. (When you look at a lawn fertilizer label, nitrogen is the first number in the formulation.) For Bermudagrass lawns, provide a monthly application through the warm months. For ryegrass, fertilize monthly through the cool season. Fertilizing properly helps keep a lawn healthy, and helps prevent weeds from becoming established.

As mentioned, continuous leaching, a byproduct of fast-draining soils, can result in a loss of available nutrients in the soil. Plants show a need with yellowing of leaves, called chlorosis, caused by the lack of available iron or other elements in the soil. It can easily be identified: Leaf veins remain green while the rest of the leaf turns yellow. Apply iron chelates, available at your nursery, as soon as it is noticed.

## Mulching to Save Water, and More

Covering the soil with a layer of organic material prevents soil from crusting, which reduces the need to cultivate. Mulching also improves soil structure and lowers soil temperatures.

A layer of mulch should be about 3 inches thick. In large open areas, mulches can help reduce weed populations and add a decorative covering.

When the sun bakes the top few inches of soil, it can

### *In a Desert-Friendly Garden*

Most plant problems that appear to be caused by pests or disease are often a result of incorrect cultural practices. Planting too low or too high, poor soil drainage, over- or underwatering, too much or too little fertilizer and exposure to weather extremes can stress plants, causing their health to suffer. Know what your plants need to grow. Plant in the right exposure at the right time of year. Water, prune and fertilize correctly and you'll prevent most problems from occurring.

damage or kill fragile roots that grow near the surface. Soil temperatures in mulched areas can be 8 to 10 degrees cooler compared to soils without mulch.

Mulches help maintain uniformity of soil moisture. In areas where a silty layer of soil affects the flow of water into deeper soil layers, a mulch alleviates the air-tight silt layering, allowing moisture to penetrate deeper.

Materials that are generally available as mulches include organic matter such as ground bark, composted redwood sawdust and compost. Gravel, decomposed granite or rock are mulch coverings but do not improve soil structure. Bark chips and bark chunks can be used, but when kept moist, they turn an unattractive gray color in just one season. Strong winds, common in the Coachella Valley, can also blow them away from plantings. Animal manures are not satisfactory as a mulch due to problems with salt accumulation. They should also be well-composted before applying around plants.

Organic mulches decompose and combine with the soil, so replenish them regularly. Do not allow mulches that tend to retain water to remain in constant contact with stems and trunks of plants, or fungus and disease problems may occur.

Compost is one of the best mulches and soil amendment available. In addition, a compost pile is excellent for recycling yard waste—grass clippings, leaves, pruned twigs—that would ordinarily find their way to a landfill. This simple compost pile takes up little space and is easy to make with discarded shipping pallets.

## Controlling Insect Pests

In many cases you can identify insect culprits by the damage they inflict on leaves and other plant parts. Fortunately, the number of pests in the Coachella Valley are seasonal. Few insect invaders bother the majority of native shrubs, trees and groundcovers.

### Sucking Types of Pests

Aphids leave their mark with curled leaves, distorted new growth and damaged flower buds. Their first arrival coincides with the burst of new growth in the spring, their most vigorous period of activity. Aphids come in many colors—black, green and yellow—and can literally cover lush tips of new leaves and stems. See photo, page 18.

Because their sucking of vital juices causes injury, you can control them with sprays. Sprays can be *systemic,* which means that they are absorbed by the plant and kill the pests when they tap into the sap of the plant. Other sprays kill insects by contact.

To avoid killing natural predators such as ladybird beetles (ladybugs) with an insecticide meant for aphids, you can simply wash away the pests with a blast of water from a garden hose. Spray as soon as you see evidence of their activity and repeat as needed while pests are active.

Aphids prefer roses, some annuals, new growth on pyracanthas, oleander and even citrus. Vigorous-growing

A simple layer of mulch over the root area of this acacia helps in many ways. It conserves moisture by reducing evaporation, insulates the upper layer of soil from cold and heat and cuts down on weed growth. Over time, an organic mulch will decompose, helping improve the soil.

plants such as oleanders usually have no problem outgrowing their damage.

Spidermites cause leaves to be mottled, stippled and sometimes turn yellow. Most damage occurs with arrival of hot weather. Shaking suspect leaves over a clean sheet of white paper will show spidermites if they are present. They are so tiny that a magnifying glass must be used to see them.

Mites attack citrus, and are common pests on conifers such as Italian cypress and groundcover junipers. Follow the same controls as with aphids. If infestations are severe, treat with a miticide. However, the best defense is a good offense. Keep plants watered properly, not too much or not too little, and they will be more healthy and resistant to pest attacks.

### Chewing Types of Pests

Thrips are practically invisible, but leave behind their marks on the surface of leaves and fruit, causing them to form streaky, distorted scar tissue. Their most active period begins during the warming trend in early summer and again in early fall. Controls are the same as with aphids and spidermites.

Beetles, caterpillars and grasshoppers leave behind ragged chewed-out spots on leaves and flower buds.

Many systemic controls are available. Other controls are sprayed on leaves and stems to kill on contact. Check your nursery for current recommendations.

**Caution:** The incorrect use of pest control chemicals can be extremely dangerous and hazardous to plants, pets and people. Read all product labels and follow instructions carefully.

## Preventing and Controlling Diseases

A preventive control program is probably the best method to reduce fungi or other plant diseases on susceptible plants. Major plant diseases in the Coachella Valley often involve citrus, oleander, roses and annuals such as petunias, vincas and zinnias.

Poor soil drainage is made worse when excessive soil is piled high on the crown at the base of a tree. Sunburn damage can also bring on gummosis disease on citrus. Indications of this disease are lesions in the bark near the bases of stems. Discolored sap may flow from the infected area.

Overhead watering of roses in the evening hours during periods of high humidity can bring on mildew. You'll see it as a gray, powdery covering on new foliage and buds. Apply sprays or powders to treat at first sight. Avoid by watering at ground level and water during early morning.

Be on the lookout for aphids in early spring. They love to attack tender new growth.

Ladybird beetles (ladybugs) are beneficial insects, preying on insect pests such as aphids (left).

Rabbits are notorious for enjoying the plants in your garden as much as you. This low fence help deter them from these flowers but may not provide 100 percent security, particularly if rainfall and naturally occurring food sources are scant.

Oleander leaf scorch deserves special mention. It's a bacterial disease believed to be spread by the glass-winged sharpshooter, a native leafhopper insect. Symptoms are brown leaf tips, with dieback that spreads first to branches, then to the entire plant. The bacteria shuts down the plant's water-conducting system, eventually killing the plant. Currently, plants 20 to 30 years old are most affected. In addition to oleanders, other plants may be susceptible. At this time there is no cure. Contact your local cooperative extension service for help in identifying this disease.

## Controlling Weeds

When you engage in a constant struggle to control weeds, you need to evaluate the costs, methods and effectiveness of using chemicals and their impact on the environment—both local and the entire world.

It's important to control weeds in gardens and landscapes regularly to reduce aggressive competition for water, garden space and nutrients. And a weed-free garden is more attractive and more healthy.

Several options are available to control weeds. They include hoeing, cultivating, mulching to reduce their numbers (and make them easier to remove), pulling by hand, applying chemicals and using the solarization method, described in the following.

Above all, keep weeds in check by not allowing them to take over your garden. Left alone to multiply, they will! When you see them, destroy them. One of the best times to engage in a weed-pulling session is right after a decent rain. Then, when the soil is moist, weeds can be pulled fairly easily, roots and all. Toss pulled weeds immediately in the trash. Leave them on the ground and they often reseed, continuing the cycle.

Applying a mulch over the entire planting area is a simple way to control weeds.

For weed control methods that require chemicals, seek advice at your nursery for recommendations on products and application methods. Grassy weeds such as Bermudagrass, nutgrass or Delhigrass require a material that is absorbed into the root zone. Broadleaf weeds such as Russian thistle, spurge and others have spray materials formulated specifically for their control. In all cases, follow all directions on the product label. Apply chemical applications carefully on windless days to prevent harming humans and pets.

### Using the Sun for Weed Control

*Solarization* uses the sun to kill weed seeds. It is a simple but effective weed control method that is even used by commercial vegetable growers in the Southwest. A similar process applies to the home garden as well. It is a helpful method prior to sowing an area with wildflower seeds, reducing future weed growth that will compete with your wildflower seedlings.

The process begins after the weather heats up—late spring to early fall. Irrigate the area to be treated so moisture reaches 6 to 12 inches deep. Cultivate soil 4 to 6 inches deep and rake level. Lay clear (not black) plastic over the area. Shovel soil over edges of the plastic covering to seal in heat and to hold the plastic in place. Allow seeds time to germinate, which will take 2 to 4 weeks. The build up of heat under the plastic quickly kills weed seedlings. After seedlings have been killed, remove the plastic and dead growth. Work the soil well before planting your wildflowers, vegetables, annuals and perennials.

A straw mulch helps control weeds and serves as a clean pathway down the center of this vegetable garden. Inorganic materials such as rock, gravel, decomposed granite or stepping stones are options. Note that the narrow planting beds can be reached to tend to plants fairly easily; a drip irrigation system simplifies watering.

# Gardening Month-by-Month in the Coachella Valley

## January

January is usually our coldest month, with pleasant days and cool nights. There's even a chance for frost.

This is the last opportunity to plant bare-root roses, grapes and deciduous fruit trees. Prune your roses and deciduous fruit trees this month. By now, red bird of paradise shrubs have gone dormant. Cut back stems to about 18 inches above ground level. Plant cool-season vegetables and herbs. These are the best choices for success for a food garden in the valley.

**January:** Plant cool-season vegetables.

January is the ideal month to make additions or changes in the garden while temperatures are kind. It is a good month to do a major retrofit of your garden. (See also December.) Now's the time to transplant cold-hardy plants, including perennials. Check tree stakes and ties. Trees may have grown over the summer months, and ties may be too tight on trunks. Also be sure stakes are secure to provide support against strong winds coming soon.

## February

Warming trends this month set the stage to fertilize citrus trees. Water annuals and perennials diligently. Control winter weeds.

Complete pruning of roses and deciduous fruit trees.

February is an excellent time to plant shallow-rooted groundcovers, native plants and other low-water use plants. Hold off planting frost-tender plants such as citrus and bougainvillaea until next month, to avoid a possible late frost. Continue to plant winter vegetables. (See page 147.) Check plants for aphids or other pests and control as soon as you notice them.

Begin deep watering of trees and shrubs at their drip line in anticipation of spring growth surge.

## March

The warm, mild weather of March prompts rapid and even excessive growth of plants as well as visits from insect pests. Roses, citrus and hibiscus are most susceptible. For aphids, wash them off with a strong jet of water. If this does not work, check with your nursery for a safe product. When thrips attacks citrus, they cause leaves to curl and scar fruit rind. Control is difficult. Take some comfort in the fact they will be gone soon. White flies are attracted to bright yellow. Place a sheet of yellow cardboard covered with petroleum jelly near susceptible plants to capture them.

To reduce fruit set of olives, spray with a flower control spray while trees are in bud. Spray again when two-thirds of blossoms are open.

Fall-planted annuals reach peak bloom in March. Thin crowded plants.

**February:** Check plants frequently for pests such as aphids.

**March:** Set out summer crops that you started from seed earlier in the year.

Pinch back stems of snapdragons to induce new flowering stems to develop. Apply crabgrass control to lawns if crabgrass has been a problem in the past.

Water needs increase for all plants as temperatures rise. Reset irrigation system amounts to provide more moisture. Consider purchasing a smart controller for your irrigation system. It adjusts to conditions automatically. Fertilize citrus, lawns, perennials and vegetables. As flowering bulbs complete their bloom, remove old flower stems.

Plant landscape plants as soon as possible this month if you missed the fall planting season. Your goal is to help them begin the establishment process before summer heat arrives.

## April

This is a great garden month and a time when the color season reaches its peak. The danger of frost has passed so now is the ideal time to plant subtropicals that are sensitive to cold such as bougainvillea, hibiscus, lantana, cape honeysuckle and citrus.

Prepare soil in sunny beds to plant warm-season annuals such as marigolds, periwinkle and zinnias.

If periwinkle plants wilt and die, they likely have periwinkle wilt. Remove and discard plants. Bermudagrass should be "encouraged" this month. If lawn was overseeded with winter

**April:** Prime time to go nursery shopping for fresh plants.

ryegrass, cut the lawn low, which slows the winter rye's growth, giving the dormant Bermuda the opportunity to regrow. Apply high-nitrogen fertilizer and water thoroughly.

As temperatures increase in the latter part of April, winter annuals will begin to lose their vigor. Remove plants as they fade or begin to die out.

Prune and thin *Sennas* and Texas rangers lightly after flowering ceases. Your goals are to control growth and maintain natural forms, yet increase spread of plants and create additional wood for the following flowering season.

If you didn't do so in March, review irrigation schedules (both mechanical and hand watering) and increase water to accommodate the increase in temperatures.

Deadhead (remove) spent flowers and fertilize roses after each bloom period for a final crop before hot weather.

Control weeds and Bermudagrass in flowerbeds. Don't put this off; regular weeding prevents disaster.

## May

May brings the first touch of summer, affecting plants in many ways. The heat also slows human activity in the garden this month.

Review drip irrigation systems and flush out lines to eliminate dirt and debris that could clog lines or emitters. Increase watering amounts to about twice the amount you were watering last winter. For more specific amounts, see the chart on page 36.

Apply organic mulches beneath the root areas of citrus, roses and perennials.

Winter and spring annuals have faded, while many perennials such as coreopsis, gaillardia and rudbeckia are developing vigorously and just beginning their color season.

Clean up dead leaves and faded flower stalks on daylilies. You can remove spent yucca and aloe flower stalks once they are past bloom. Some gardeners leave them for the interest they provide when dried.

If cold-tender plants were damaged by frost last winter, recovery should

**May:** Add mulch to conserve soil moisture. Do this any time of the year.

be well underway. By now new growth on live stems should tell you which stems and branches are alive or dead. Prune dead stems and branches to live tissue.

## June

Summer has arrived with a vengeance and it is critical to maintain a regular irrigation schedule.

Prune to control rampant growth of oleanders, citrus, lantana, bougainvillea and hibiscus. Lightly thin excess interior growth of mesquites. Remove crossing branches of palo verde trees.

Remove Bermudagrass that has invaded planting beds. Pull it by hand, or spray with a product containing

**May:** Water regularly. Monitor drip irrigation systems, particularly with plants in containers.

glyphosate. Take action as soon as you notice it; wait too long and it can become difficult to eradicate.

Roses, shrubs and young trees benefit from the addition of a 3-inch-thick layer of mulch. It helps keep roots cool and slows evaporation of moisture from the soil.

Palms and cacti transplant most readily in hot weather. Move early in the warm season so plants have time to recover with good growth, responding to sunshine and deep irrigations.

## July

With highs ranging from 105°F to 120°F, it should be no surprise that gardening practically comes to a standstill this month. Any gardening task becomes a gigantic obstacle during a Coachella Valley summer. Early risers find ways to take care of necessary

**June:** Irrigation is job one. Keep an eye out for wilting plants, and water immediately.

**July:** The generous summer sunshine causes plants to grow rapidly. Check plant ties often.

jobs despite the heat, which is often accompanied by high humidity.

Weeds are growing rapidly; regular control is important.

Trim off spent rose blooms that keep trying to flower despite the heat. Apply mulches to help plants endure high temperatures.

Monitor all irrigation systems closely. Failure now without early detection may result in a disaster.

Be sure to water trees deeply. Palms, especially, respond to slow, deep irrigation. As mentioned in June, summer is a good time to plant or transplant palms and cacti.

If chlorosis shows on eucalyptus and other trees, treat with soil acidifiers. Ask your nursery for advice on current products.

Indoors, with air conditioning, begin planning for the fall. It's a good time to plan a retrofit to make the garden more water efficient. And there's hope: After July, only two months remain until the fall planting season, and the onset of cooler temperatures!

**July:** Extend watering basins for summer irrigations.

## August

August is a near-repeat of July, only high temperatures seem to extend longer and higher humidity plays more of a role. Rains may or may not appear.

Remove dead basal foliage of perennials. Deadhead spent flowers of coreopsis and rudbeckia.

Trim away dead flowering stems of autumn sage, *Salvia greggii.* This stimulates creation of new flowering stems for the fall and winter season. Likewise, lightly cut back old, tired stems of blue salvia, *Salvia farinacea*, to encourage new basal growth.

Make plans for fall planting of annuals and perennials. Order seeds

**August:** Check drip emitters often this month as heat continues.

of adapted wildflowers for planting in September and October. Pick a cooler, cloudy day to prepare fall planting beds by digging organic materials into the top 8 to 10 inches of soil.

Rebuild basins on plants, especially on slopes, to hold in irrigation water. Check drip irrigation systems to see that they are operating correctly.

Continue to control unwanted Bermudagrass. If overseeding your Bermudagrass lawn, hold off on fertilizing—renovation and reseeding is just two months ahead. If not overseeding, then fertilize.

Hold off on shearing or pruning for another month. Pruning now may expose formerly shaded stems and foliage to sunburn.

**August:** Prune spent flowers to improve the overall look of the garden.

## September

The 15th of this month launches the most important planting season of the year. Planting reaches its peak by October 15. This slender window of time is ideal for new plants to develop roots when the soil is warm before cooler air temperatures in late fall and winter slow plant growth. As part of soil preparation to renew flower and vegetable beds, add organic materials and slow-release fertilizers. Plant trees, shrubs and perennials from containers. Plant bulbs and bulb cover such as sweet alyssum.

Farmers rotate their crops to prevent disease. Follow this same practice on a smaller scale. If petunias, snapdragons and pansies have been planted continuously in the same soil for a number of years, plant these annuals in a new location, giving the old bed a rest. Or apply a fungicide to prevent die-off problems with new plantings.

Later in the month, as the path of the sun drops lower to the south, gradually taper off irrigation. However, continue to deep-water trees and shrubs. (See Irrigation Guide chart, page 36.)

## October

Container plantings of cold-tender plants are fine now, as long as you are able to move them to protected locations when frost threatens.

This is the month to turn your home landscape into a showcase

**September:** It's prime time to plant. Don't miss plant sales at botanic gardens.

of color. Everything is in your favor. The weather is mild and nurseries are loaded with fresh plants in containers, flats and pots. Well-rooted seedlings adjust readily to transplanting during this season. Moisten soil prior to planting. Water plants in gently after planting and continue to water regularly as they begin to become established.

October is the best time to sow wildflower seeds, but you can continue to sow seeds up until mid-November. How to establish wildflowers is described on page 133.

## November

Continue fall planting if you missed the October period. Plants will establish a little slower as temperatures cool.

Move cold-tender plants in containers under shelter to protect from freezing temperatures.

By November, many perennials such as rudbeckia and gaillardia that flower from summer into fall have completed their bloom cycle. Cut back to basal growth and clean up leaf debris.

**October:** Sow wildflower seed this month for flowers next spring.

Chrysanthemums are in their prime. Cut flowers to enjoy as bouquets. This also helps flowering branches from drooping excessively.

During November (and October) and into December, Texas rangers are in bloom. This makes it a good time to visit your nursery so you can select plants by their flower color. More than a dozen selections of Texas ranger, *Leucophyllum* species, are now available.

Hold off pruning or thinning citrus until after flowering ceases in spring.

## December

This is a great month to take advantage of the delightfully mild winter weather, and tackle those major garden projects. Here's ten things you can do in the December garden:

1. Install a drip irrigation system complete with smart irrigation controller. It will save water throughout the coming year, and years to come, paying for itself.
2. Plant perennials and accent plants such as cacti, succulents and ornamental grasses in place of beds of annuals. This will save you water, money and time spent on maintenance. See The New Look of the Color Bed, page 132.
3. Develop a wildlife garden in a corner of the yard to attract birds, hummingbirds, bees, butterflies and small critters.
4. Grow plants in colorful pots you decorate yourself to give as holiday gifts.
5. If your landscape has drainage problems, create a drainage swale, and if possible, include a retention basin. Or build a simulated creek bed with rocks and boulders to channel and disperse runoff. How to create a dry creek bed is explained on page 150.
6. Make a rock garden on a natural-shaped, flowing mound to serve as a landscape feature. Plant nooks and crannies with flowering perennials, groundcovers, ornamental grasses and accent plants.
7. Reduce the size of large lawns, especially in front yards. Install a border for the smaller lawn area. Plant the remaining perimeter with water-efficient shrubs, grasses and groundcovers.

**December:** Cooler weather and time to do the heavy work, such as a lawn replacement.

8. Build a raised bed garden to grow a vegetable, herb or color garden. Incorporate ample amounts of organic matter into the soil to provide your plants with optimum growing conditions.
9. If you have an old garden with woody hedges and overgrown plants, give it a face lift. Remove old, tired plants and bring new ideas into play with colorful, water-efficient, low-maintenance plants.
10. If you have a large expanse of gravel or other nonliving groundcover surrounding your home, replace some areas with low-water-use groundcovers and shrubs. Position plants at the base of structures to cut down on reflected heat and light, reducing cooling costs inside.

# Water-Efficient Irrigation

How much and how often do you need to water landscape plants in the Coachella Valley? This is a common question asked by many desert gardeners, particularly newcomers. Answering this two-part question is complex due to a number of variables. Drying winds, soils that drain fast, soils that drain slow, and the wide range of water requirements of the many plants that grow here impact how much and when to water. For example, established natives and desert-adapted plants need much less water than tropical or subtropical shrubs and trees, shallow-rooted annuals, non-native perennials, groundcovers and lawns. Other factors play important roles, such as competition for water from the roots of nearby shrubs and trees, age of plants, time of year, and exposure to the sun, including reflected heat from buildings and streets.

Lush tropical plants may require daily watering during the summer and twice weekly during the winter. Even low to moderate water users may need irrigation every other day during the summer, depending on the water-holding capacity of the soil.

Succulent plants, including cacti, do well without regular watering. Established cactus gardens can survive with hand watering from a garden hose two to four times a year, depending on rainfall. Speaking of rainfall, some years no measurable rain falls in the Coachella Valley! Generally, even the most drought-tolerant plants appreciate monthly or bimonthly watering through the summer.

The water needs of plants also depend on its native origin and the genetics of the individual plant. Even with these many variables, the following lists some good general guidelines to follow.

## Plants and Their Day-to-Day Water Needs

Soil type has a great impact on how much and how often to water plants. One of the toughest aspects of watering plants properly in the Coachella Valley is soils can be extremely variable, even within a single home lot. All cove and dune areas in the valley have soils that are well drained and retain little water. The best water-holding soils exist along the Whitewater Stormwater Channel from Rancho Mirage to Indio, in the lower cove of La Quinta, in the Indio and Coachella areas and most of the lower valley. In some areas, soils may actually be poorly drained, and certain plants will not thrive there.

Plant roots absorb water from the soil. Water is carried up to the leaves, drawn as water moves out into the drier outer air through microscopic pores in the leaves. This process is called *transpiration*.

Plants lose most of their water between noon and 4 in the afternoon. Roots absorb water day and night but, on a hot day, transpiration through the leaves may exceed absorption through the roots. If the loss is great, plants show their distress by wilting, but they often recover. If enough moisture exists in the soil, moisture content in the leaves will return to normal at night. If water loss is too great, it can cause the plant to suffer damage or even cause death.

Left: Micro pop up is a great replacement for rigid risers. Spray head pops up to spray above plant materials yet drops down to ground level when not in use.

Above: Drip emitters are the most efficient method in supplying moisture to thirsty plants. Water is applied slowly to the root zone, soaking into the soil, to benefit your plants.

Plants will "tell" you when they need water by lackluster color, and drooping, curling leaves. It is better to water before they reach this stage to avoid major stress.


A liberal application of an organic mulch over the root zone of plants—about 3 inches deep—reduces water loss due to evaporation, cools the upper layer of soil to the benefit of plant roots, and cuts down on competition from weeds that steal water from your plants.

Plants start photosynthesis even before the sun breaks over the horizon so the best time of day to water is early morning before temperatures begin to rise. This gives plants a proper supply of water to face the heat of the day. Early morning also tends to be a time of lower winds and thus reduced evaporation. Water early enough so that the leaves have time to dry before nightfall to avoid development of fungal diseases. If you need to water late in the day consider methods such as drip irrigation that will not wet leaves.

Deep soaking trees, shrubs, palms and vines, young or old, helps them develop deep root systems. Deeper, wider, more extensive roots will have access to reservoirs of moisture in the soil. Access to this moisture is important during extended hot or dry conditions, which place extra demand on the plants.

Water should be applied at the plant's drip line. This is an imaginary area located at the outer perimeter of the plant. Picture where rain would naturally drip off of the leaves to the ground. It is here that the plant has its water-absorbing roots, or feeder roots. Near the trunk, you want to encourage development of strong anchoring roots. Watering deep and wide has an added benefit. Trees and shrubs with an extensive root system are not as easily blown over by strong, gusty winds.

To meet the needs of the plants and to save on water bills, water should be applied to the soil slowly so that it can soak in deeply. As mentioned, this encourages deep rooting, with roots well below the hot surface soil. A drip irrigation system on an automatic timer or smart controller becomes a valuable tool to making this irrigation program come to life.

## Technology that Tells How Much and When to Water

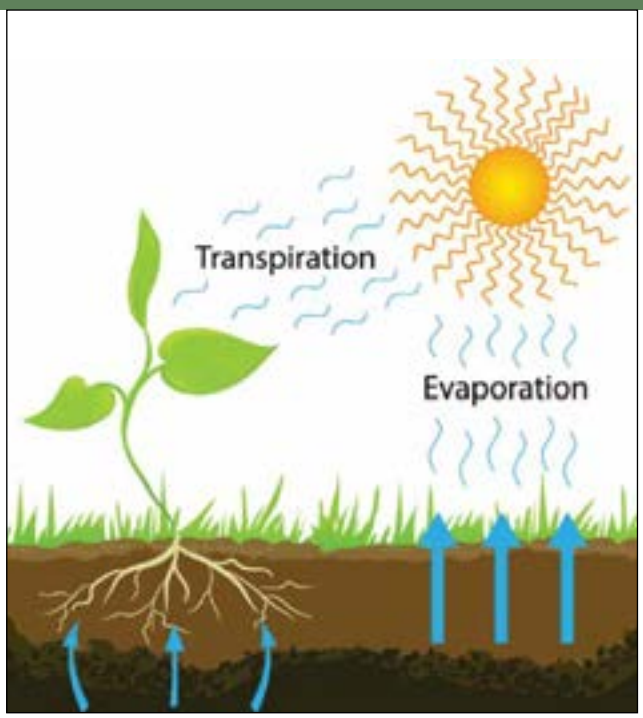
Computer technology applied to current local weather conditions is available to help the home gardener irrigate precisely, replacing plant moisture loss.

Developed and operated by the California Department of Water Resources primarily for agricultural irrigation, the California Irrigation Management Information System (CIMIS) is especially helpful to provide information on lawn irrigation. A home computer is not necessary, although it could make the information more useful.

### Evapotranspiration (ET)

The easiest way to understand evapotranspiration is to think of it as the opposite of rain. Evapotranspiration is the amount of water that evaporates from the soil and plant surfaces, plus the amount of transpiration through the plant. Temperature, solar radiation, humidity and wind velocity all affect ET on a daily basis. Knowing when plants need water and when they are saturated is the first step to a healthy, thriving landscape.

A CIMIS station gathers local weather information and sends it to Sacramento for analysis. This information is then distributed to local irrigators.




This illustration shows the process of *evapotranspiration.* Water evaporates from the soil and plant surfaces, in addition to the amount of transpiration from the plant. Nutrients, dissolved in water, are absorbed by the root system and distributed to the leaves.

Underwatering and overwatering are both detrimental to your plants. In fact, the majority of plant issues today are a result of too much water. When you observe a plant that is not doing well the first impulse is to give it water. Often this is the opposite of what a plant needs. ET helps guide us as to when and how much to water your plants. Imagine if you had a way to determine the moment you were getting hungry and then were able to satisfy that hunger without overeating. You would be happy and productive. By monitoring ET we can do exactly that and have happy thriving landscapes as a result.

Because ET was originally developed for agriculture, precise figures for many landscape plants have not yet been calculated. The reference ET, or ET°, is a good starting point. If the daily reference ET is known, you can calculate the daily irrigation need. As part of the process, you can program irrigation system automatic controllers to deliver that amount. Moisture stress—replacing less moisture than ET losses—can cause plants to temporarily stop growing. By irrigating established plants at 80 percent of ET, they will grow about 50 percent less rapidly. As a result, the homeowner can mow and prune less frequently without injuring plants. Irrigating at less than 80 percent will cause high water using plants to weaken and decline, becoming more susceptible to disease and pests.

Always irrigate fruit trees and vegetable gardens at 100 percent of the ET rate. Less than 100 percent and the quality and quantity of the vegetables and fruit you harvest will be greatly diminished.

### Smart Controllers

Today there are many "smart controllers" or weather-based controllers you can purchase that make the daily ET calculations for you and adjust water times of the controller for each day. Imagine if you were doing a good job and adjusting your controller on a monthly basis, which would be 12 adjustments per year. A "smart controller" makes adjustments 365 times a year! The savings in water as a result of these adjustments is typically 20 to 25 percent a year. In addition, the price of smart controllers continues to decrease while the technology improves, making them worthwhile investments.

Conventional controllers require users to manually enter desired watering days and watering durations. This is often inefficient and results in either overwatering or underwatering your plants and turf.

Weather-based smart controllers with sophisticated scheduling engines and internet accessibility are more precise, so they generally have a higher potential for greater water savings. When selecting a smart controller review the cost of features offered and consider if the expected water savings are justified.

### CIMIS Computer

CIMIS information can be accessed on to the Coachella Valley Water District website at www.cvwd.org. Even without computer access, the National Weather Service makes the information accessible by announcing local ET information every day on KIG 78, the Coachella Valley weather radio station (162.4 MHz).

## Designing a Water-Efficient Irrigation System

Irrigation systems are available for every type of landscape. A drip irrigation system is best for areas that contain shrubs and trees. An automatic pop-up sprinkler system is a must for efficient lawn watering. Drip emitters or bubblers can water extensive flowerbeds or groundcovers as well as vegetable gardens. A smart controller regulating the irrigation system(s) is optimal for savings and convenience. Gardeners and plants greatly benefit from smart controllers on irrigation systems.

Drip irrigation slowly and precisely places water in the root zone on a regular basis to encourage proper growth and healthy plants. Only the root zone is irrigated, and little water is wasted on open spaces between plants. This reduces water loss to evaporation by as much as 60 percent.

*In a Desert-Friendly Garden*

**Five Ways to Maximize Your Water Savings**

1. **Rain Sensors—**Temporarily shut off irrigation when it rains. Wireless rain sensors are available from all the major manufacturers.
2. **High Efficiency Nozzles—**These have lower flow rates and apply water at lower application rates to reduce runoff in comparison to conventional spray nozzles. High efficiency nozzles typically improve efficiency by 10 to 20 percent.
3. **Pressure Regulated Sprinklers—**Spray heads are designed to operate at 30 psi and rotors are designed to operate at 45 to 50 psi. When sprays and rotors operate at pressures higher than designed, both flow rates and inefficiencies increase dramatically. By using pressure-regulated sprinklers flow rates are reduced, misting is reduced and efficiencies increase by 10 to 30 percent.
4. **Turf Conversions—**Replacing turf with low-water-use plants reduces the landscape water requirement. Once established, low-water-use plants typically use 40 to 50 percent less water than turf.
5. **Drip Conversions—**When spray heads are replaced with low-volume drip systems, water is applied much more efficiently, directly to the root zone, with an efficiency as high as 90 percent. By comparison, spray nozzles efficiency ranges from 50 to 60 percent.

### Get in the Zone

The first step in designing your own irrigation system is to evaluate your landscape. Draw a map of your lot, including existing plants. Graph paper, with one square equaling a unit of measurement, works well. Make several copies of this master layout. On one copy, draw in plants you want to add to the landscape. If you have an existing irrigation system, draw that on your map as well.

Next, define separate watering zones. Each zone should consist of plants with similar water requirements, from low to very high. Irrigation zones are based on how often plants in that zone need to be watered, as well as typical soil depth for their roots. Actual gallon amounts applied is not a concern at this stage.

The average automatic irrigation control "timer" has space for six zones, which is usually more than enough for the average home landscape.

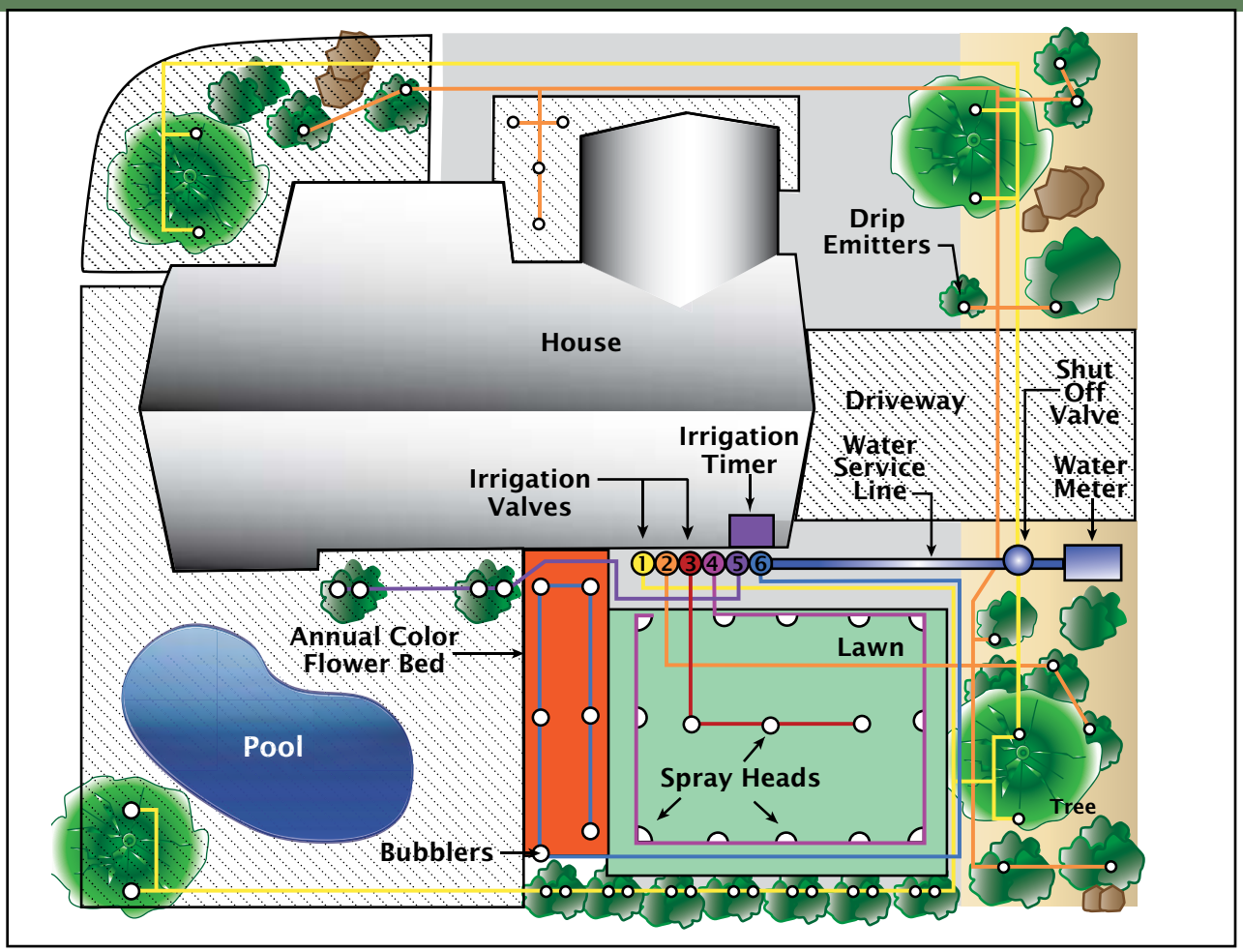
Typically, Zone One includes trees and large shrubs that need infrequent, yet slow, deep irrigation. Zone Two usually includes small shrubs, perennials, vines and other plants that need regular irrigation. Zone Three and Zone Four could be for a vegetable garden or lawn—areas watered every day in summer. Zone Five could be for plants in containers on the patio, which require irrigation every day via a drip system. Zone Six may be groundcover or flowerbeds, irrigated with bubblers or multiport "spider head" drip irrigation.

## Installing an Irrigation System

At last, you have decided on your irrigation zones. Now you need to decide where you (or your contractor) will install the controllers and valves. If you are interviewing contractors and they do not fully understand the following basic questions, consider finding another contractor.

- ❑ *Where is the water source that is most easily accessible, yet where the irrigation system will be unobtrusive?*
- ❑ *What is the pipe size at that point?*
- ❑ *Where is the electric power source for any automatic controller?*
- ❑ *Where is the most easily accessible yet unobtrusive site for automatic controller and the control valves?*

Before going to purchase your equipment, make a list of the required supplies. If your irrigation plan is




Overhead view shows the layout and features of a well-designed system. See "Get in the Zone," opposite page, for design guidelines.

neatly drawn to scale, the irrigation equipment supplier should be willing to help compile a list of what you'll need, along with an estimated price.

The hardest part of installing an irrigation system is the physical digging of holes where all the pipes and valves will go. Start with the mainline. The mainline leads from the water source to a location where you will be placing your valves. As mentioned, the mainline is generally constructed of PVC pipe rather than polyethylene because it is more resistant to pressure changes. As you leave the water source and begin the mainline, install the emergency shut-off and the backflow preventer. You can also install a single filter for the whole system at this point.

Depending on your design, you may have a short or long mainline. You may even have several mainlines to different zones. Keep in mind that if you use an automatic controller, you will also need to run the control wires to the automatic valves.

Once your mainline trench is dug to where your zone control valves will be located, lay in the mainline. Next, install the valves and all the associated devices you will need for each zone line. This is occasionally referred to as the valve assembly.

Coachella Valley Water District adopted a Model Landscape Ordinance to establish Landscape and Irrigation System Design Criteria as a response to the severe drought conditions in 2007. The Ordinance has been updated since then but the purpose of the criteria remains the same: to promote water conservation through climate-appropriate plant material and efficient irrigation systems, and to create a "Lush and Efficient" landscape theme by enhancing and improving the physical and natural environment. The Model Landscape Ordinance is a useful tool when designing new or rehabilitated landscapes and applies to all new and existing projects requiring a building or landscape permit, plan check or design review. A copy of the Ordinance can be downloaded at http://www.cvwd.org/31/Conservation.

This drip zone control kit shows the correct installation of components. Water is moving "downstream." From left to right: control valve, filter (black) and pressure regulator.

Each zone will need a filter if you have not already installed one. Next step is to install the control valve. The control valve can be automatic or manual. If automatic, it is linked by a low voltage wire to the automatic controller.

Immediately after the control valve, install a pressure regulator. As an option, you can install a pressure gauge after the regulator.

If your zone lines are constructed of polyethylene, you must install an adapter that links the pressure regulator to the zone line. This device permits easy disconnect for any necessary repairs.

Now that your valve assembly is complete, you can begin to run the zone lines to where they are needed.

### Micro Irrigation or Drip Systems

Professional-quality landscape micro irrigation equipment was developed initially for agricultural use. Coachella Valley farmers have been among the world leaders in developing and using micro irrigation techniques. Homeowners in the Coachella Valley benefit by having easy access to several specialty irrigation stores. These stores are excellent sources for equipment, as well as advice. Irrigation professionals are available to suggest problem-solving steps and provide expert guidance.

For commercial applications, irrigation systems must be strongly constructed, resistant to vandals, hidden from view, be able to be locked, and must operate with a minimum of supervision. Home systems need not be so heavily constructed. For optimal, long-term survival of any irrigation system, quarterly maintenance is necessary. This maintenance schedule is easy to remember. Often, it is performed at the same time when automatic timers are adjusted for the change in water need as the seasons and temperatures change.

**Installation Tips—**Insert fittings with locking rings are the best choice today for polyethylene irrigation tubing. Insert fittings with locking rings secure the tubing on the fitting and speed installation. No tools are needed. It is simple to install tubing over a single barb, which creates a positive stop that ensures tubing is fully installed. The lock ring secures the tubing on the fitting. The barb design ensures tubing will not slip out or blow off at high pressure and temperature. As a bonus, these fitting can be reused.

Compression fittings that grip the pipe from the outside are another choice. Admittedly, they can be difficult to compress into place but are less expensive than insert fitting with locking rings. Never use lubricant to install the compression fittings! If necessary, you may warm the polyethylene pipe in hot sun or with a heat gun or hair dryer to make the fittings easier to install.

The older style "insert fittings" should not be used. They grip the hose on the inside and can come loose and leak with fluctuating pressure or summer heat.

Zone line or supply line should be run around the outside perimeter of all the plants served by that zone. To get water to the plants, you install distribution tubing from the supply line to the plant. A drip emitter is inserted into the supply line and the distribution tubing attaches to the emitter and runs to the root zone of the plant. Installation of a bug cap is recommended for the end of the distribution tubing to help prevent clogging.

Make a hole in the supply line for this connection using a punch, a special tool you can purchase at irrigation supply stores. You can cut a hole with a knife or icepick, but if the hole is too large it will leak. If you have a leak, your only option is to cut out that section of hose and replace it with another section, connecting the replacement pipe with compression fittings.

Standard installation will have at least one emitter at each plant. Trees will have three or more emitters, depending on size and water requirements. The goal should be to moisten at least 50 percent of the soil volume within the plant's drip line.

A plant's drip line is not the same as an irrigation drip line. The plant drip line marks an imaginary area around the outer perimeter of the plant—where rain would drip off of the leaves. It is here that the plant's feeder roots, which absorb water and nutrients, are located.

For healthy trees and shrubs that will resist being blown over by the wind, encourage wide rooting by placing emitters at the plant's drip line and beyond. Because plants are continuously growing and increasing

in size, you will need to periodically adjust the location of the drip emitters, as well as add more emitters.

With a zone line located well away from the base of your large plants and with long micro tubes, it is simple to move emitters as plants grow. Planning for future growth is important.

Tubing ½ inch in diameter carries 240 gallons per hour (GPH), so you don't want to exceed 240 gallons per hour in your zone. Add the number of emission devices in gallons per hour. You don't want to exceed 240 gallons an hour. If you do, you will need to increase the size of your supply tubing. Also, do not exceed a length of 500 feet for your supply line. The friction loss beyond 500 feet is too high to provide consistent watering. An easy way to remember the rule of thumb for distribution tubing is called the 30 by 30 rule. Distribution tubing that is ¼-inch should not be longer than 30 feet or 30 gallons per hour.

Frequency of watering will depend on soil type and weather conditions. See Plants and Their Day-to-Day Water Needs, page 25.

Drip emitters usually come in 0.5, 1 or 2 gallons (or more) per hour (GPH) sizes. The variety of plant sizes, water needs, soil types and growing conditions can make selecting emitter sizes confusing. Plants growing beneath trees or in the shade of a structure will need less water than the same plant species in an exposed full sun location. However, many plants that prefer shade are actually high water users, and may even require more water than the trees providing the shade.

Because of the big difference in the comparative water requirements of small shrubs and large trees, they should be placed on separate zones, also called *valve circuits*. Mid-sized plants generally can share any zone available by adjusting the number and size in GPH of the emitters that provide their water.

Emitter size and placement also depends on soil type. Sandy soils drain so rapidly that water moves very little horizontally (from side to side) in the soil. Emitters must be spaced closer together in sandy soils to provide sufficient coverage of the root zone. If the area isn't windy, micro spray heads may be more efficient than drip heads in such soils.

Fine-textured (clay) soils allow drip emitters to soak wider areas, reducing the number of emitters needed. However, water spreads slowly downward through clay soils, so delivery time should be increased.

On slopes, place emitters uphill 12 to 18 inches from the drip line of the plant. This way water flows down toward the plant to provide more adequate coverage.

A drip irrigation system in a raised bed is a simple but effective method of irrigating vegetables, herbs or flowers. Cover planting beds with an organic mulch to make the garden more attractive and also conserve moisture by reducing evaporation.

Often, many different plant types are planted close together in a home landscape. Some need more moisture than their neighbors. Drip emitters with different flow rates can be used at the same operating pressure to meet individual plant needs. Multiple outlet emitters also can be installed to apply more water to large trees or shrubs.

Emitter example: Two shrubs of similar size are planted on the same zone. Shrub A is a high-water user. It gets 5 emitters that flow 1 GPH. Shrub B is a low-water user. It gets 3 emitters that flow at 1/2 GPH. The system operates for 6 hours once a week. Shrub A (high water) has 30 gallons to sustain it for the week. Shrub B (low water) has 9 gallons to sustain it.

Keep in mind that this example is for established plants, not newly planted ones. Also note that all plants in the same zone (the same station) will be irrigated for the same amount of time.

## Specialized Irrigation Systems

**Vegetable Gardens—**A vegetable or herb garden should be on its own irrigation zone. Drip irrigation is an option, but specialty devices such as in-line drippers, multi-heads or irrigation tape can also be used. Check your garden daily when the system is first installed to be certain plants are receiving adequate moisture. Once the summer garden is established, watering may be required only two to three times per week, depending on soil type and the garden's exposure.

**Flowerbeds—**Drip irrigation for special situations such as flowerbeds can be challenging. This is where specialty drip devices are of value, much the same as with vegetable gardens. Look to in-line drippers, multi-heads, irrigation tape or bubblers to supply the varied water application needs of these plants.

A single dry spot that suddenly appears in the lawn is probably the result of one sprinkler failing. For example, one rotor head is not turning or there is a clogged nozzle.

An example of sprinklers out of alignment or with the wrong spray nozzle pattern. Over-spray onto nearby buildings, sidewalks or fences wastes water and can cause unsightly damage.

**Groundcovers—**If a desert-adapted groundcover is used, irrigation is simple. Due to low water needs, well-spaced drip emitters will be ample as long as the run time evenly moistens the soil covered by the groundcover.

If high-water use plants are installed, the homeowner may opt to use specialty devices such as in-line drippers, multi-heads, irrigation tape or bubblers.

**Irrigating a Grass Lawn—**A grass lawn should be on its own zone. The control valve must be an atmospheric breaker valve, also called an anti-siphon valve. The pipe for the entire zone should be rigid PVC pipe.

An irrigation system that sprinkles water from overhead is usually the right choice for lawn irrigation. Depending on the size and shape of the lawn, install either pop-up sprinklers or pop-up rotors.

Plan your system so the entire surface of the lawn is watered without over-spraying any areas, or leaving areas dry. Avoid over-spray on buildings or fences, which can cause extensive damage over time. If possible, avoid spraying surrounding landscape plants where fungal diseases or water spotting will become a problem.

When the weather turns cool, homeowners often neglect watering Bermudagrass lawns. Never allow them to become bone dry, even if they are not overseeded. If winter rains are absent, irrigate at least once or twice a month. Doing so will allow the lawn to recover more promptly in spring.

## Retrofitting an Irrigation System

Retrofitting an irrigation system usually occurs when homeowners move from lawn sprinklers or bubblers to drip irrigation. Most of the time, existing PVC piping can be utilized for the new system. Another method is retrofitting existing spray heads with new high efficiency nozzles, discussed below.

Begin by checking the operation of existing valves. These valves may need to be replaced with low flow valves that are designed for reduced flows

Drippers may be installed on existing PVC piping and irrigation-head risers by using a multiport fitting. This allows you to connect 6, 8, or 12 lines of micro tubing (with drip emitters on each micro tube) from a single location cut into the PVC. If connecting multi heads to existing PVC is not an option in your landscape, you'll have to install new polyethylene zone lines.

Polyethylene tubing can be attached to PVC pipe with a special compression adapter. Polyethylene can be run from existing valves and placed where necessary to water plants in each zone. For best landscape appearance and longevity of the polyethylene tubing, bury it a few inches below the soil surface.

A drip-irrigation controller must be capable of long cycle watering—from 1 to 6 hours. If it is electronic, it is probably adequate for the new system. Electro-mechanical controllers usually have 30- to 60-minute maximum run times per zone. If drip irrigation will be installed on an existing electro-mechanical station, it is best to replace it with an electronic weather-based controller.

### Retrofitting Spray Heads with High Efficiency Nozzles

As the cost and value of water continues to increase, it is time to rethink irrigation practices that allow water waste. During the last 25 years millions of spray heads have been installed in landscapes across the Coachella Valley. Fortunately, with technological advances in

| Common Irrigation Issues and Simple Fixes | |
|---|---|
| **Run Off** | Water runs off your landscape because it is being applied too fast to be absorbed into the soil. Solve by programming your controller with multiple start times. Instead of watering for 12 minutes a day try 3 different start times with 4-minute run times. Separate the start times by one hour to allow water to soak into the soil. Check your controller to see if it has a cycle and soak feature. |
| **Misting** | Water misting everywhere when you turn on your sprays is almost always caused by high water pressure. Most spray heads should operate at 30 psi, but the majority of irrigation systems in the valley operate under higher pressure. Regulate the pressure down at the emission device or at the valve. Or install pressure reducers or pressure-reducing sprinklers. This is typically easy and inexpensive to do and provides the quickest payback. |
| **System Operates in the Rain** | Many excellent wireless rain sensors are on the market today. Some shut off irrigation at the slightest hint of rain. Install your sensor where it will receive accurate rainfall. If blocked by a roof or overhang it will not provide an accurate reading. |
| **Mature Shrub Blocks Irrigation** | This is a clear sign you should consider switching to drip irrigation. You can prune your shrubs, but their health and appearance may suffer. Converting sprays or rotors to drip saves water and money and reduces time required to weed spots bare of plants yet are receiving water. |
| **Broken Head** | Broken heads can waste hundreds of gallons of water. At a minimum, inspect your irrigation system monthly for broken heads and spray alignments. Better yet, inspect after each mowing. |
| **Leaking Valves** | Sand, rocks and other small debris in the water system can prevent an irrigation valve from fully closing. These "invisible" leaks add up: oozing out at only ½ gallon per minute becomes 30 gallons per hour, 720 gallons per day and 5,040 gallons per week. Look for small wet spots in the gutter that never dry out. Some may have a slimy green, gray or brown coat. |
| **Old Irrigation Controller** | Irrigation controllers older than 5 years old are not utilizing current technology and therefore waste water and money. Upgrade your controller to a new smart controller. See page 27. |
| **Watering Walk-ways and Drives** | Usually caused by spray heads or rotors getting out of alignment. Make a habit of checking your system after each time you mow to reduce water waste and save on bills. |

nozzles, the efficiency of a pop-up sprinkler can be improved. High efficiency nozzles help reduce water loss compared to spray heads in several ways, with an improved efficiency increase by 10 to 20 percent.

**Heavier Droplets Equals More Water Delivered —** High efficiency nozzles are more efficient, due in part to the heavier streams and bigger droplets they deliver. The extra weight helps prevent those droplets from being carried away by wind. According to most manufacturers, the high efficiency nozzles allow a much more significant amount (as much as 35 percent) of water to land on the desired area.

**Run Off is Reduced—**High efficiency nozzles apply water to your landscape at a much slower rate than traditional spray nozzles. This allows the water more time to soak into the soil and less or no water wasted to runoff. Because the water is being applied more slowly and the nozzles operate at lower pressure, they can be an excellent solution if you experience low water pressure.

Using high efficiency nozzles can be counter-intuitive. Because the amount of water is applied at a slower rate, in most instances you will need to increase the amount of time you water, which means recalculating run times. If you are using a smart controller, add the parameter for the high efficiency nozzles (and let the smart controller do the calculations for you) so the run times reflect the amount of water being applied.

## Maintaining and Troubleshooting an Irrigation System

When plants wilt or die, the cause may be a malfunction of the irrigation system. Regular maintenance of the system can usually prevent this. When problems occur, rational, systematic troubleshooting techniques can identify problems so you can make repairs.

**Daily Watering Schedule for Turfgrass in Minutes per Day**

| Month | Spray heads | Rotary heads |
|---|---|---|
| January | 3 | 7 |
| February | 5 | 13 |
| March | 7 | 18 |
| April | 10 | 22 |
| May | 12 | 27 |
| June | 14 | 30 |
| July | 13 | 30 |
| August | 12 | 27 |
| September | 10 | 22 |
| October | 7 | 14 |
| November | 4 | 10 |
| December | 3 | 6 |

This table shows the approximate amount of water required for a lawn. Individual watering times vary based on sprinkler efficiency, soil and weather conditions.

Maintenance and repairs are easier if you've planned the initial installation carefully. Controller wiring should be arranged so all valves operate in sequence as you walk around the house. Some controllers have an optional test cycle schedule built in, which is typically two to five minutes per zone.

Electrical problems can be troublesome. Again, preventing problems with a quality installation is the best policy. Wire connectors at automatic control valves must be properly waterproofed or, better yet, use all UL approved connectors made for direct burial.

Controllers should be on their own circuit breaker to prevent loss of power if another appliance malfunctions. Heat causes a lot of controller failure. To reduce controller failure caused by heat, position them out of direct sun—especially afternoon sun. Install away from air conditioning units, which produce heat. Replace backup batteries in time clocks at the beginning of each summer.

## How Efficient is your Lawn Irrigation System?

To find out if water is being applied evenly throughout the lawn area, perform this simple test. First, set several empty coffee cans, tuna cans or other straight-sided containers on the lawn. Place in a grid pattern between sprinklers. Run spray head sprinklers for 15 minutes; run rotor head sprinklers for 30 minutes. After this allotted time, use a ruler to measure and record the depth of water collected in each container. By using containers that are all the same size (with identical surface areas), water volume for separate areas around the lawn can be compared by pouring them into a kitchen measuring cup. If there is a difference of more than 20 percent between maximum and minimum, identify problem spots and adjust sprinkler head flow rates.

Most spray head irrigation systems spaced 12 to 15 feet apart should accumulate about 1/2 inch of water in 15 minutes of operation. Most irrigation systems using larger rotor sprinklers spaced 25 to 40 feet apart will accumulate about 1/4-inch of water in 30 minutes.

## Preventative Maintenance of Lawn Systems

Operate the test cycle manually from the controller after each mowing to check for damaged or malfunctioning sprinkler heads.

Heads must pop up to clear grass and pop down at the end of the cycle. If they do not, debris is clogging them or there is another problem. Clean and flush the heads.

Look for clogs, rotors not turning, heads tilted out of alignment, or part-circle heads twisted out of horizontal alignment. Also check for head-to-head sprinkler coverage. Each sprinkler should throw water to just reach the area covered by the adjoining sprinkler. If it is coming up short, it could be caused by a major loss of pressure due to a broken head or pipe. This will need immediate repair. A broken sprinkler head can waste at least 500 gallons of water a week and continue to cause other sprinklers on the system to malfunction.

A "double swing" joint installed on sprinkler heads usually prevents major damage to the installation. The best time to include the joint is when the system is installed. To make a double swing joint, lateral tees and ells are installed at 90 degrees to vertical and two-threaded street ells are installed before installing the sprinkler riser. Flexible risers can also be installed on existing systems.

**Homeowner Alert—**Be aware of possible liability problems caused by injuries from improperly placed sprinkler heads. Be sure all heads are below grade of adjacent walkways, but only slightly so.

If lawns slope toward a structure or sprinklers throw water onto a structure, moisture can enter the wall, causing severe damage. Regrade planted areas so water drains away from structures. Replace or redirect errant sprinklers.

## Preventative Maintenance of Irrigation Systems

Run a test cycle on your controller after every mowing. It allows you to see if each valve is coming on and shutting off properly and if you broke any emission

devices or moved any out of alignment. Run the system long enough to check all water devices. Also see following for some diagnostic tips when the system is giving you trouble. Start at the beginning of the system and check each of the following:

**Water Meter—**Observe the flow routinely when the irrigation system is running. Changes in flow rate will warn of problems. Unusually fast flow is indicative of a leak. An abnormally slow flow indicates clogged filters or emitters. Some high-tech systems use electronic flow meters connected to controllers to automatically shut off a system or valve when the flow rate goes outside preset limits. When this happens, an error message is left for the user.

**Emergency Shut-off—**Operate this valve to be sure it still works properly. By testing it once per quarter chances are it will not be frozen open when you need it to close.

**Filters—**Quarterly cleaning is a must, but clean them more often if the system does not appear to be flowing properly due to loss of water pressure.

**Controller—**Check regularly that the correct time and day of week are displayed.

**Controller Program—**Check and adjust every couple of weeks during spring and fall and every month or two during summer as needed. It is important to keep pace with changing weather conditions unless a soil-moisture sensor override system or if a weather-based controller is used.

If the controller is electronic, determine if it is running the personalized program you set it to run, instead of the default program. If the default program is running, check the battery backup system and replace batteries as needed. You will then have to reprogram the controller as well.

**Irrigation Schedule—**For heavy water users, determine if at least 80 percent of daily evapotranspiration (ET) requirements are being met. Low-water use plants may require only 40 to 60 percent of daily ET, while lawns in late spring or early summer may be much higher. See irrigation guide for landscape plants, page 36, and irrigation guide for lawns, page 34.

**Irrigation Timing—**Operate irrigation systems early in the day during summer and early enough in the day in winter so plant leaves dry before dark.

**Valves—**Check for flow. Be sure the optional manual override on automatic valves is not frozen open or shut.

**Pressure Gauge or Schrader Test Valve—**This optional piece of equipment is set at the end of a micro irrigation system to diagnose leak or pressure regulator problems.

**Drip System Lines—**Flush lines quarterly by removing all of the end caps and running the system for about two minutes. Put the end caps in your pocket when you remove them so they won't be washed away by the flow. Likewise, flush lines after breaks are repaired. Better yet, install an automatic flushing device at the end of your lines and they will flush each time the system starts.

**Emitters—**Check for clogs or lost emitters. Look for any leaks caused by damaged pipe or micro-tubing.

**Bubblers—**Check for proper flow and any leaks.

**Runoff—**During a normal irrigation cycle, check for water runoff. If water is running off, divide application into two or more cycles during the day separated by an hour of "soak-in time."

## Diagnosing Irrigation Trouble

**Valve issues—**If valves fail to operate at all, this may happen after you tested the system and you forgot to return the automatic controller function switch to the "run" position. Professionals and amateurs alike make this error surprisingly often.

If you have an electronic system, the second-most common reason valves do not operate is due to a program being set incorrectly. Examples include when the day is set to "off," the "skip days" is incorrectly set or the "start time" is set to off.

Loose wires on the valve or controller can cause valve failure. Check wire connections and tighten them.

The solenoid in the valve may be defective. Test with a multimeter or voltmeter. If it is bad, you may be able to replace the solenoid, or replace the entire valve.

Valves open at the wrong times. This is due to incorrect programming of the automatic controller. It may be as simple as resetting the a.m. and p.m. setting of the clock.

**Electronic controller has no display—**Power to the controller has been lost. Check the breaker. If it is OK, turn the breaker off and check controller wiring to the house current.

**Dry spots between sprinkler heads—**This is usually caused by a clogged or broken spray head. A broken riser or pipe below the riser can also be the problem, but not as often. Unclog the sprinkler head or repair the break. Misaligned spray heads can also cause dry spots. Occasionally, dry spots are the result of low water pressure. Dry spots a few feet from rotor heads with green interlinking rings farther out between heads, or, in the case of spray heads, green around the head and dry in between, is a sign of low pressure. Clean or replace the filter to fix.

## Guide to Irrigation Components and Terms

It's helpful to become familiar with irrigation terms and products, which can be complex. Keep in mind that most stores that specialize in irrigation supplies (good sources to purchase your components) offer valuable assistance to the do-it-yourselfer, and are willing to help you understand how components work, to aid in selecting, installing and maintaining irrigation equipment.

**Automatic Controller—**Also called a *timer*, it functions to control the watering cycle by sending a signal to the control valve(s) to open or close on the days and times you pre-select. You program the controller and direct it when, how long and how often to water plants. For outdoor installation, check for a gasket-sealed door and a sturdy case that can be locked.

**Backflow Preventer—**A device that prevents the water in the irrigation system from siphoning back into drinking water. In all of California, ordinances require installation of backflow preventers. An example of this would be an anti-siphon valve.

**Bubbler—**Water bubbles downward, rather than sprinkling. Use to water planter beds by slowly flooding the bed, or place them near individual plants according to the plant's gallons-per-minute requirement. Often used to water trees that prefer flood irrigation, such as citrus. Also rated in gallons per hour, and available as adjustable or non-adjustable.

**Bubbler, Adjustable—**Higher quality devices require a tool to set or adjust the flow (generally a Phillips head screwdriver). Check for a wide range of flow adjustments, debris filters and set flow adjustments that hold.

**Bubbler, Nonadjustable—**More tamper resistant than adjustable types. Check for availability of several flow models, pressure compensation and debris screens.

**Emergency Shut Off—**Necessary to allow you to shut off water to the irrigation system in case of an emergency. It is recommended the irrigation system be installed on a separate water line stubbed off of the main water line that goes into your home.

**Emitter, Compensating—**Use where there are elevation extremes of more than 10 feet. They produce a nearly constant flow rate regardless of changes in water line pressure.

**Emitter, Drip—**In a drip irrigation system, an emitter, also called a *dripper,* slowly releases the water. Available in button or flag devices,

### Irrigation Guide for Trees, Shrubs and Groundcovers in the Coachella Valley

| Trees & Shrubs | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *High | 45 | 56 | 53 | 59 | 60 | 59 | 59 | 57 | 63 | 52 | 44 | 42 |
| *Medium | 31 | 35 | 33 | 38 | 39 | 38 | 38 | 37 | 41 | 33 | 28 | 28 |
| *Low | 14 | 21 | 16 | 17 | 18 | 18 | 17 | 17 | 18 | 16 | 14 | 14 |

***Gallons per day for established trees and large shrubs: 15 to 20 feet high and as wide.***

| Groundcovers | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *High | 2.4 | 2.8 | 3.1 | 3.0 | 3.0 | 3.1 | 3.1 | 3.0 | 3.2 | 2.8 | 2.3 | 2.1 |
| *Medium | 1.8 | 1.9 | 1.8 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 1 | 1.8 | 1.6 | 1.4 |
| *Low | .7 | .9 | .9 | 1.0 | .9 | 9 | .9 | .9 | 1.0 | .9 | .7 | .7 |

***Gallons per day for small shrubs and groundcovers.***

| Irrigation Days per Week | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2 | 3 | 4 | 5 | 6 | 7 | 7 | 6 | 5 | 4 | 3 | 2 |

**Plants are categorized as high, moderate or low water use in the chapter, Desert-Friendly Plants, pages 40 to 137.*

To calculate how long to water with a drip system, divide the gallonage ratings of your emitters into the gallons per irrigation multiplied by 60 minutes. Here's an example. For a 1-gallon emitter on a plant requiring 3 gallons per cycle: multiply 3 x 60 divided by 1 (1-gallon emitter) = required irrigation time of 180 minutes, or 3 hours. Large trees and shrubs naturally require larger and more numerous emitters. Four 2-gallon emitters apply the same amount of water in one hour as a single 1-gallon emitter in 8 hours.

Drip emitters deliver water efficiently.

some of the newer, self-cleaning flags are a worthwhile option in areas with hard water (See Maintaining and Troubleshooting your Irrigation System, page 33.) Emitters are rated by gallons per hour (GPH) of water they deliver. Select emitters that deliver an appropriate GPH depending on your plant needs and soil type. (See chart.) In sandy soil, it's helpful to release water for shorter but more frequent periods. Clay soils do not drain rapidly so can accept lower GPH emitters but with longer running times. Note: It is possible to mix emitters with different GPH on a single zone line.

**Emitter, In-Line Dripper—**A type of drip emitter that is placed in a long continuous line of tubing. Useful in vegetable gardens, flowerbeds or for groundcovers. These slowly emit water to soil around plant roots, and use less water than bubblers or sprinklers.

**Emitter, Non-Compensating—** These emitters have a set flow rate at a given pressure and are used on level ground.

**End Cap—**Every irrigation zone (line) requires an individual end cap. By removing this cap, you can clean the line out after installing the system—before first use. Clean out all the dirt, sand and debris in the line, which can clog emitters or sprinklers. End caps should also be opened periodically so lines can be flushed clean.

**Filter—**All irrigation systems need some type of filter to keep dirt and debris from clogging the emitters. Look for one that comes apart easily for its quarterly cleaning. Some stores sell fertilizer tablets that can be placed inside the filter. Do not use these because they lead to salt build-up and clog the drip emitters.

**Fittings—**Pieces of pipe are connected with various fittings. Common fittings include 45- and

Threaded end cap on ½ inch emitter line is easy to remove to flush dirt, sand and debris from the lines.

90-degree elbows, "T" connectors and straight connectors (to connect two pieces of pipe). Special adapters are available that link different types of pipe, such as PVC pipe with polyethylene pipe.

Filters help keep irrigation lines from clogging, so water is delivered on time and in the right amounts.

**Irrigation Tape—**Used in commercial agriculture, and can be used in home vegetable gardens. It is a specially constructed, thin-walled drip pipe that has holes placed every few inches to discharge water. Lay down an irrigation tape for each row of planting. Install on the soil surface and cover with mulch or bury one or two inches deep.

**Mainline—**Water line from water source to the valve assembly. A mainline is usually PVC pipe.

**Manifold—**Term used to cover a number of valves placed near one another, possibly because the entire apparatus appears similar to the exhaust manifold of an automobile engine. Also called *valve manifold*.

**Micro Spray Head—**Emits water in a spray diameter around the head. These were once popular for groundcover beds. However, they have proven to be inefficient, with a large percentage of water applied lost to evaporation. For a more modern irrigation system that is more efficient, replace micro sprayers with multi-heads and drip emitters or bubblers.

**Micro Tubing or Distribution Tubing—**Used in drip irrigation, this narrow diameter tubing delivers water from polyethylene pipe to the drip emitters. It is attached to polyethylene pipe with barbed connectors.

Holes for the micro tube connectors are punched using a specialized punch tool that you can purchase when you buy your other supplies. Purchase a number of "goof-plugs" at the same time. Use them to close any holes made in the wrong spot on the polyethylene pipe, or to plug micro tubes that are no longer in use.

**Mister—**A type of emitter that sends out a mist of water. Used especially in greenhouses that

need to maintain high humidity, or occasionally on patios for plants that require high humidity.

**Multi-Head—**Part of a drip system that allows 6, 8 or 12 lines of micro tubing to come out of a single, central location. Used in planting beds or with groundcovers. Also called an octopus or spider-head.

**Pipe—**Polyethylene tubing and PVC (polyvinyl chloride) are the two most commonly used types of irrigation pipe. Both types include UV resistant compounds, and both can last up to 20 years. Tip—When in doubt always use a larger diameter pipe. It will not harm anything to use a larger pipe size. For example, if you are uncertain whether to use a ¾-inch or 1-inch pipe, the larger pipe is the safest choice. Pipe is seldom "too large." If you install a system with a pipe size that is too small you will have to reinstall the pipe. Forcing water into a smaller pipe lowers the water pressure and hinders sprinkler performance: The smaller pipe creates more pressure loss due to friction and turbulence as the water flows through it.

Polyethylene pipe is commonly used for drip irrigation because of its flexibility and ease of use. Local ordinances require lines to be buried.

**Pipe, PVC—**A rigid pipe generally used for commercial applications and lawn systems. Pipes are cut with a saw and linked using fittings and special glue.

**Pipe, Polyethylene—**This is a soft, flexible pipe or tubing, most commonly used for drip systems. Once only available in black, it is now available in a variety of colors, or with various stripes on the tubing. This makes is easy to identify which tubing is delivering water to different zones. Polyethylene can be cut with pruning shears or a polyethylene-cutting tool. Sections are then linked with insert fittings, compression couplings or spin lock connectors that take less time and labor compared to compression fittings to press into place.

**Pressure Gauge—**Used in commercial applications, and not generally required by the homeowner. Water in desert regions often contains minerals or salts that can build up over time. A pressure gauge, installed downstream from both the filter and pressure regulator, lets you know when it's time to clean the filter. Maintaining a regular schedule of quarterly (every three months) cleaning the filter and flushing lines eliminates the need for this device.

**Pressure Regulator—**A device that maintains steady water pressure within your lines. One must be installed in each zone. Pressure regulators insure that surges in water pressure do not rupture lines or blow emitters off the tubing. Pressure regulators are rated by the pounds per square inch (PSI) of water pressure they permit. Generally a 20-PSI regulator is ideal for a home landscape. Depending on the type of lawn sprinklers you use, you may need a higher PSI. If you need to apply water that must rise up a slope from where your valves are located, you may need a higher PSI, as well as pressure-compensating emitters.

Rotary nozzles apply water slowly so are good choices when watering on a slope.

**Rotary Nozzles—**send out thick, uniform sprays of water. Water drops are larger so they are not as affected by winds compared to traditional spray nozzles, and are efficient at reaching the targeted areas of lawn or landscape plantings. In addition, they apply water at a slower precipitation rate, which reduces runoff and water waste. They are of particular value when used to irrigate slopes, reducing soil erosion. Rotary nozzles can easily be threaded onto most existing systems.

**Rotor, Pop-Up—**A form of pop-up sprinkler that will cast the water in a rotating circle. It can be set to sprinkle in a full 360-degree circle, or as little as a 90-degree arc.

**Sprinkler—**A wide range of types are available, with a variety of techniques used to disperse water through the air to the targeted garden location. However, a great percentage of water applied can be lost to wind and evaporation by using sprinklers.

**Sprinkler, Pop-Up—**Irrigation device that will pop up out of an underground housing to water an area, then descend into the housing once watering is over. Sprinkler heads with plastic components and with pop-down springs are currently popular but have a shorter

A popup rotor distributes water evenly in a rotating circle. You can adjust it to supply water in an arc from 90 to 360 degrees.

life expectancy than the older style constructed of brass or other metal. A pop-up height of 4 to 6 inches is ideal for lawn. Check for debris screens to reduce clogging. Heads are available in several nozzle patterns and radii (color-coded ones are preferred). These provide coverage to small irregular areas. Low-angle nozzles are recommended for windy locations.

This broken pipe is obvious, but many times broken heads or lines are hidden. Inspect your irrigation system frequently, such as after every mowing.

**Valve—**Valves can be automatic or manual. One option is to have manually operated valves for each zone. You simply turn the valve on when plants in that zone need water. Also called *control valve*. If you convert to low-water-use plants throughout your landscape, a manual valve is an inexpensive option. This is because many desert-adapted plants need only a periodic deep soak once every three weeks or so in summer. Many require no water in winter once they are established. Valves are generally made of durable plastic. For commercial applications, brass is more expensive but recommended. Also, brass is preferred if valves will not be sheltered in a housing. (See below.)

**Valve, Atmospheric Breaker—**A type of valve required in landscapes that include lawn. It allows the water to bleed back out of the line and allows the pop-up sprinklers used to irrigate the lawn to drop back down into their housings. Once these were the only type of valves available, and depending on the store, may still be the only type. The atmospheric breaker capability is not required for drip lines.

**Valve Automatic—**These are electrically operated by the controller. The low-voltage electricity comes from the controller into a solenoid on the valve that "tells" the valve to open or close. Purchase valves with a back-up manual option. This allows you to operate the valve even if the controller or solenoid is not functioning.

Features to check for: emergency shut-off; manual override; replaceable solenoid assembly.

**Valve Housing—**Valves are generally placed in protective housings, which can be either above or below ground. Decide which works best for you and your landscape before you visit the store. Underground housings have a much nicer appearance and are much less obtrusive, yet limited access to valves makes it more difficult to work on them in case of malfunction. Valve housings were once available only in green but now come in other colors that blend in the landscape, including a desert tan.

**Valve, Shut-Off—**These can be either a gate valve, which functions like a water faucet, or a ball valve, which rotates 90 degrees to close a ball inside the pipe. Ball valves are preferred, and are less likely to break down or freeze up over time.

This in-ground valve housing is a tan color to blend into the surrounding landscape.

**Water Delivery Devices—**Generally speaking, lawns are irrigated with sprinklers. Trees, shrubs and other plants can be irrigated with drip emitters or bubblers. Sprayers and misters can also be part of an irrigation system in special situations.

**Zone—**Group of sprinklers that operate together and are controlled by the same control valve. Also called a *station*.

**Zoneline—**Water line from the valve assembly and extending around a particular zone. Generally, PVC pipe is used for lawn zones and polyethylene pipe is used for all other irrigation zones.

CHAPTER THREE

# Desert-Friendly Plants

What makes a plant "Desert-Friendly?" The simple explanation is that it is adapted to grow in our low-elevation desert climate. The first chapter in this book, *The Desert Gardening Difference,* explains the factors that make our gardening experience unique. Even though we contend with extremely high summer temperatures, less-than-fertile soils and strong winds, you might be surprised to discover about the wide range of plants we can grow here. The generous sunshine, mild winters and long growing season allow an incredibly diverse group of landscape plants to thrive.

Why Desert-Friendly Plants? We realize more each day how water—lifeblood of the desert—is truly a finite resource. Ultimately, we must be mindful of the plants we choose to create our outdoor environment, as well as follow water-efficient irrigation practices that maintain their health and beauty.

The landscape plants we have at our gardening fingertips are constantly changing. Many are native to our low-elevation desert; others come from similar arid climates around the world. With a thoughtful eye turned toward smart design, these plants are gradually changing the face of our valley. By their nature, they require less water to keep our landscapes attractive and inviting.

Consider these "new," water-efficient plants as candidates for your own landscape. In the long term, it is wise for all of us to select and grow plants that are *Desert-Friendly.*

## Guide to Understanding Plant Basics

The symbols below accompany the plants in this chapter. They communicate in visual terms what each plant needs to grow successfully: preferred *exposure to the sun, water requirement* and *cold hardiness*—the plant's inherent ability to withstand cold. Because conditions are so variable from garden to garden, use these recommendations only as a guide. Note that water requirements represent relative water use; the great majority of plants in this book are low or moderate water users. Most plants rated at three drops are bedding plant annuals. Use them judiciously. (For smart ways to include annuals in your landscape, see The New Look of the Color Bed, pages 132 to 133.) Water requirements are for established plants, which mean they have lived through at least two summers in our desert climate.

Plants that feature this star ☆ are considered Star Performers in the Coachella Valley. They are among the easiest to grow and the most forgiving.

**Canopy Coverage** is the amount of shaded area in square feet that a plant will cover when it is fully grown. This information may be important if you participate in a lawn replacement program. Note that annuals are temporary plants so are not considered canopy coverage replacement plants.

**Reflected Sun**

**Full Sun**

**Partial Sun**

**Shade**

**High Water.** Water every day in summer.

**Moderate Water.** Water every other day in summer.

**Low Water.** Water two to three times per week in summer. Most cacti and succulents: every two weeks in summer.

**Cold Hardiness.** Lowest temperature before plant is severely damaged or killed by cold.

Left: The bright purple pads of purple prickly pear, *Opuntia santa-rita*, add color and interest to any landscape. As an added bonus, large yellow flowers bloom profusely in spring.

Above: Desert willow, *Chilopsis linearis*, is a Star Performer in the Coachella Valley, and can be grown as a shrub or small tree. Many selections are available—the orchid-like flowers come in a range of bright colors.

# TREES

Trees are extremely versatile and valuable plants, playing a role in many important landscape functions. They help create privacy and provide a backdrop for a home or other plants. Trees provide permanent structure to a design and establish the scale of the landscape. A selection of large trees, planted in the right locations, create a landscape's framework. Small trees, shrubs and vines and other plants play supporting roles. Perhaps most important in the desert, trees provide shade, cooling homes and outdoor living areas.

Most trees require several years to reach maturity, so select and locate them carefully. Make doubly sure there is enough space for their mature height and width. Be particularly aware of the mature height of trees if utility lines are near your home, restricting the space above them.

Photo above: *Prosopis* hybrid.

# Acacia species

## Acacia

Acacias are native to regions all around the globe. With almost 1,000 species, a wide variety of forms, textures and colors are available, including both evergreen and deciduous plants. Acacias are tolerant of heat and most are low to moderate water users. Provide trees with deep, infrequent irrigations to help establish root systems. Flowers are individually tiny but are clustered into puffballs or long drooping flowerheads called catkins.

### Acacia aneura


MULGA

Evergreen and thornless, mulga grows slowly to 20 feet high and 15 to 20 feet wide. Small, narrow, silvery gray leaves are leathery, similar to those of an olive tree and are dense along the branches. Makes a fine windbreak and screen. The yellow catkin flowers are heaviest during late spring into summer. Native to Australia. Canopy coverage: 314 square feet.

Mulga, *Acacia aneura*.

### Acacia berlandieri


GUAJILLO

Like many native American acacias, the light green leaves of guajillo are delicate and appear almost fernlike. This evergreen tree grows at a moderate rate from 10 to 15 feet high and 12 feet wide. Fragrant, cream-colored, puffball flowers bloom in tune with spring weather. Plant in well drained soil. Smallish thorns are usually not a serious hazard. Gradually prune lower branches if your goal is to develop a small tree. Native to southern Texas and Mexico. Canopy coverage: 113 square feet.

Guajillo, *Acacia berlandieri*.

### Acacia craspedocarpa


LEATHERLEAF ACACIA

Grows slowly from 10 to 15 feet high and 8 feet wide with a rounded crown. Evergreen with rounded, upright, gray-green leaves. Yellow puffball flowers bloom spring to summer. Prune into a tree or leave shrubby as an alternative to oleander. Effective as a screen. Native to Australia. Canopy coverage: 50 square feet.

Leatherleaf acacia, *Acacia craspedocarpa*.

## Acacia farnesiana

SWEET ACACIA

*(Acacia smallii, A. minuta)*. This is a medium, open, multi-trunk tree with vaselike form, fernlike leaves, small thorns and fragrant flowers. Deciduous to semi-deciduous, it grows at a moderate rate from 20 to 25 feet high and as wide. Yellow puffball flowers are profuse in spring and produce a wonderful sweet fragrance. Avoid heavy pruning because it leads to problematic suckers. Native to Mexico. Canopy coverage: 314 square feet.

## Acacia greggii

CATCLAW ACACIA

This acacia can be trained to become a tree or shrub, growing slowly up to 12 feet high and as wide. The amount of water it receives has a direct affect on its form. In a natural environment, catclaw acacias growing alongside desert washes are often treelike. Receiving less water in the wild or a home landscape causes plants to take on shrublike forms. The finely divided leaves are gray-green; plants are semi-deciduous. Cream-colored flower spikes appear in spring and are fragrant. Branches are armed with short, curved thorns, thus its common name. Native to the U.S. Southwest and Mexico. Canopy coverage: 113 square feet.

Sweet acacia, *Acacia farnesiana*.

## Acacia rigidula

BLACKBRUSH ACACIA

A slow-growing small tree or large shrub reaching 15 feet high and as wide. Tolerates heat and drought, but will also accept moist conditions, such as near lawns. The smooth, gray bark contrasts nicely against glossy green leaves that are cold deciduous. Long catkins of cream-colored flowers bloom in spring. Some plants have thorns. Native to Chihuahuan Desert. Canopy coverage: 177 square feet.

Catclaw acacia, *Acacia greggii*.

Blackbrush acacia, *Acacia rigidula*.

### Acacia salicina

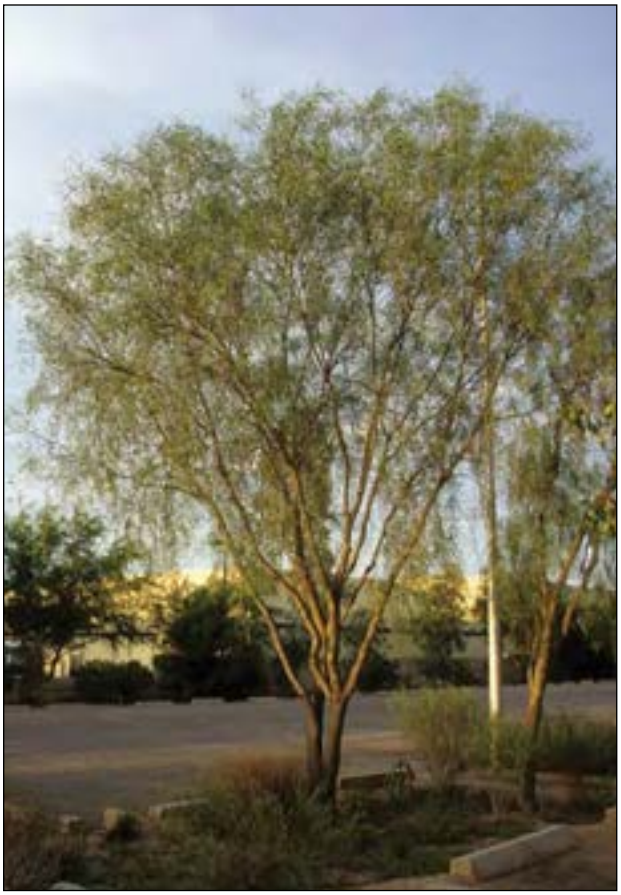
WILLOW ACACIA


A low-water and enduring alternative to weeping willow, which is short-lived in desert regions. Graceful, pendulous evergreen leaves on trees that grow rapidly from 20 to 40 feet high, spreading 10 to 20 feet wide. Creamy white puffball flowers bloom late summer into winter. Water deeply and well away from the trunk to avoid blow over during windstorms. Native to Australia. Canopy coverage: 177 square feet.

### Acacia stenophylla

SHOESTRING ACACIA


Strong, vertical and graceful, rapidly reaching 25 to 30 feet high yet spreading only 15 to 20 feet wide. This is an ideal tree for narrow spaces. Long, stringlike, light gray-green, evergreen leaves up to 4 inches long hang from its branches. It's a clean tree that does not produce much litter—useful around pool and patio areas. Do not plant in lawns. Native to Australia. Canopy coverage: 314 square feet.



Willow acacia, *Acacia salicina*.

Shoestring acacia, *Acacia stenophylla*.

### Acacia willardiana

PALO BLANCO


With delicate, papery white bark, weeping branches, fine leaves and airy form, this small acacia provides an elegant touch. Grows at a moderate rate, reaching 20 feet high and spreading to 10 feet wide. Its open form allows planting of sun-loving shrubs and perennials below it. Accepts heat, even reflected heat of south-facing walls. Native to subtropical Sonora, Mexico. Canopy coverage: 79 square feet.

Palo blanco, *Acacia willardiana*.

### Albizia julibrissin

SILK TREE, MIMOSA TREE

A deciduous tree that grows rapidly from 25 to 35 feet high and 35 to 40 feet wide. Develops a wide canopy with graceful, light green, feathery foliage. Best to stake young trees to develop form. Produces an abundance of rich pink, silky flowers in summer and sporadically at other times of the year. As flowers and pods drop, they create a lot of litter. A nice tree to view from above. Occasional deep watering is essential, otherwise, the tree is typically short-lived. Native to Asia. Canopy coverage: 1,257 square feet.

Silk tree, *Albizia julibrissin*.

### Bauhinia blakeana

HONG KONG ORCHID TREE

Grows at a moderate rate from 15 to 20 feet high and as wide. Abundant maroon to pink flowers bloom from December to April, and are quite dramatic in size and color. Deep water at drip line of tree about once each week in summer. Plant in well drained soil. Native to China. Canopy coverage: 314 square feet.

### Bauhinia lunarioides

WHITE ORCHID TREE

*(Bauhinia congesta)*. Another common name for this plant is Chihuahuan orchid shrub. It can be pruned into a small tree but usually is more shrublike, growing slowly to 10 feet high and to 6 feet wide. Produces large clusters of fragrant, white or pink flowers in spring. Water deeply every two to three weeks during summer. Native to Chihuahuan Desert. Canopy coverage: 28 square feet.

### Bauhinia variegata

PURPLE ORCHID TREE

*(Bauhinia purpurea)*. Grows at a moderate to rapid rate to form a dense crown, reaching 25 to 30 feet high with an equal spread. Leaves are medium green. Profuse magenta to purple flowers cover the branches in late winter. White-flowering forms are available. Mature trees can be seen throughout the Coachella Valley. Native to India and China. Canopy coverage: 707 square feet.

Hong Kong orchid tree, *Bauhinia blakeana*.

White orchid tree, *Bauhinia lunarioides*.

Purple orchid tree, *Bauhinia variegata*.

## Bismarckia nobilis

BISMARCK PALM


This dramatic palm will catch your eye for at least two reasons: the large, striking, light blue to blue-green fronds, and its impressive mature size: 40 feet high and 20 feet wide. Another factor is the symmetry of the palm's broad crown, which makes it a focal point in the landscape. It is a clean poolside plant, evoking a tropical mood. Plan ahead for the mature size—it is not a plant for a small garden. Accepts some shade. Native to the island of Madagascar. Canopy coverage: 314 square feet.

## Brahea armata

MEXICAN BLUE PALM


Grows slowly from 20 to 30 feet high, spreading only 8 to 10 feet wide, making it well-suited to small gardens. Icy blue, fan-shaped fronds are an attractive feature. Use as an accent or blend with other silvery-leaved plants. Low litter plant, good near pools. Mature plants feature creamy flower clusters 6 to 10 feet long in summer. Native to Baja California. Canopy coverage: 79 square feet.

## Brahea edulis

GUADALUPE ISLAND PALM


This fan palm grows slowly to 30 feet high and spreads to about 10 feet at maturity, with light green, fan-shaped fronds. An ideal palm accent in small areas or around pools; it can take extreme heat and reflected light. Provide deep irrigations monthly during summer heat. Native to Guadalupe Islands in Baja California. Canopy coverage: 79 square feet.

Mexican blue palm, *Brahea armata.*

## Butia capitata

PINDO PALM


*(Cocos australis).* Accepts frost and extreme heat and sun—hardships of every kind. Grows slowly 10 to 20 feet high with an equal spread. Gray-green, feathery leaves are long and graceful. Uniquely rugged trunk shows off the former leaf bases, helping making this palm an ideal accent plant. Apply nitrogen fertilizer to the soil if leaves yellow. Native to Brazil, Uruguay and Argentina. Canopy coverage: 314 square feet.

## Caesalpinia cacalaco

CASCALOTE


An attractive, vase-shaped small tree, growing at a moderate rate to 15 feet high and almost as wide. Spikes of clear yellow flowers bloom at the branch tips late winter into early spring. Flowers can be damaged by late frosts; avoid by planting in a protected location. Luxuriant foliage is armed with rose-sized thorns, so place away from pedestrian traffic. A thornless selection, Smoothie®, is available. Watch for psyllid pests in spring; preventative treatment is available. Prune after the flowering season ends to control ungainly growth. Native to Vera Cruz, Mexico. Canopy coverage: 177 square feet.

Pindo palm, *Butia capitata.*

Cascalote, *Caesalpinia cacalaco.*

## Callistemon viminalis


WEEPING BOTTLEBRUSH

This is an attractive small tree that grows at a moderate rate from 20 to 30 feet high with a 15-foot spread. A freely branching evergreen, it has pendulous branches that become covered with magnificent, red, bottlebrush flowers midspring and summer. Do not plant in lawns—the roots do not like to be that moist. Also avoid windy locations. Attracts butterflies and hummingbirds. Native to Australia. Canopy coverage: 177 square feet.

Also consider *Callistemon citrinus,* which is a similar tree but with a less weeping form.

## Cercis occidentalis


WESTERN REDBUD

Grow western redbud as a tree or shrub. It is deciduous, and grows at a fast rate to 15 feet high with an equal width. Established plants are cold hardy, but young plants may need protection when temperatures drop below 20°F their first few years. Pea-shaped magenta flowers bloom early in spring even before the heart-shaped leaves emerge. Flowering is better when winter cold drops below 28 degrees. Native to Arizona, California and Utah. Canopy coverage: 177 square feet.

Weeping bottlebrush, *Callistemon viminalis*.

## Chamaerops humilis


MEDITERRANEAN FAN PALM

This is a slow-growing, multitrunked fan palm. Dwarfish in habit, it is a fine palm for a small yard. Attains height of 10 to 12 feet at maturity and about 8 feet in width. Growth is more rapid with regular water and fertilizer during the warm season. Leaves are small and abundant, the *petioles* (see page 154) armed with sharp spines. Plants may sucker freely, spreading to form a dense clump. A handsome tub plant or a featured plant near pools. Native to the Mediterranean and north Africa. Canopy coverage: 50 square feet.

Western redbud, *Cercis occidentalis*.

Mediterranean fan palm, *Chamaerops humilis*.

## Chilopsis linearis


DESERT WILLOW

This light, airy, 25- to 30-foot deciduous tree is perfect for locations where you need summer shade but want winter sun, such as on the south side of the house or patio. Graceful, light green leaves provide a splendid backdrop to clusters of large, orchidlike flowers that come in shades of white, pink, red and purple. Many horticultural varieties of this lovely tree are now available, including some that flower spring and summer. Do any corrective pruning during the deciduous period—December into February. Prune lightly to control growth, create new flowering wood and to display the handsome, smooth, gray trunks. Native to arroyos in Sonoran and Chihuahuan deserts. Canopy coverage: 314 square feet.

## Chitalpa X tashkentensis


CHITALPA

This tree is a hybrid from Russia that is a cross of two genera, *Chilopsis linearis* and *Catalpa bignonioides*. Chitalpa combines some of the best characteristics of both plants. It is more evergreen and has larger, more vivid, white or pink flower clusters compared to its parents. Mature size of 20 to 30 feet high and as wide still allows its use in most gardens. Accepts partial shade. Availability at nurseries may be limited, but worth the search. Canopy coverage: 707 square feet.

Chitalpa, *Chitalpa* X *tashkentensis*.

Desert willow, *Chilopsis linearis*.

## Chorisia speciosa


SILK FLOSS TREE, KAPOK

Silk floss tree is also called the drunkard's tree, because a mature tree looks like a giant, lime green Chianti bottle topped with spreading boughs. Trunk has distinctive thorns. In fall, profuse numbers of large, rose- to wine-colored flowers appear, followed by seedpods filled with white, cottony kapok, once used to fill life vests. Trees can reach 30 to 50 feet high and spread 25 to 30 feet, sometimes much more, so they're not a good choice for a small lot. Occasionally becomes deciduous prior to bloom period. Avoid windy locations and water deeply at the drip line. Native to Brazil and Argentina. Canopy coverage: 707 square feet.

Silk floss tree, *Chorisia speciosa*.

## Cupressus arizonica

ARIZONA CYPRESS


This is a superior, medium-sized evergreen for use as a windbreak or tall screen in low-maintenance situations. Grows at a moderate rate from 30 to 40 feet high and to 20 feet wide with a pyramidal form. Gray-green, scalelike foliage varies from plant to plant. Branches have a distinct whipcord texture. Thrives in low-rainfall areas after it is established. Resistant to cypress canker. 'Gareei' is a grafted selection, which means plants will consistently have rich, silvery, blue-green foliage. 'Blue Ice' features silvery blue foliage. 'Compacta' has a more compact growth form.

Note that *Cupressus arizonica* often goes by the name rough-barked Arizona cypress, and *C. glabra* is known as smooth-barked Arizona cypress. Rough-barked Arizona cypress tends to perform better in the Coachella Valley. Canopy coverage: 314 square feet.

Arizona cypress, *Cupressus arizonica.*

## Cupressus sempervirens

ITALIAN CYPRESS


This tall, vertical accent tree is often used in formal landscapes. It is propagated by cuttings rather than grown from seed to reproduce its desired qualities. The distinctive, narrow, dense columnar form reaches 20 to 60 feet high, spreading to just 8 feet wide. 'Glauca' has attractive, bluish green, juniperlike foliage. 'Stricta' is similar in form and size with dark green foliage.

Red spidermites can attack plants in summer and may even kill drought-stressed trees. Water deeply every three weeks to help avoid this problem, and treat mites when they appear. Native to the Mediterranean. Canopy coverage: 50 square feet.

Italian cypress, *Cupressus sempervirens.*

## Dalbergia sissoo

INDIAN ROSEWOOD


This is a moderately fast-growing shade tree that generally reaches 40 feet high and 30 wide, or much larger with optimum conditions. Evergreen to cold-deciduous with below-freezing temperatures, but recovers quickly in spring. Bright, glossy green leaves cover a rounded crown. Wide-spreading roots help stabilize erosion-prone banks and slopes but suckering along the roots can be an issue; tree roots can also be invasive. Native to India. Canopy coverage: 707 square feet.

Indian rosewood, *Dalbergia sissoo.*

### Ebenopsis ebano

TEXAS EBONY


*(Pithecellobium flexicaule).* The dense, dark green leaves and spiny twigs of Texas ebony can develop into a great security barrier. Even without a utilitarian use in mind, its picturesque form makes this a desirable tree for a small garden. Avoid planting near walkways or other pedestrian traffic areas due to its small, sharp thorns. A slow grower, the mature height is 20 to 30 feet with a spread of 15 to 20 feet, but this takes many years. Fragrant, cream-colored flowers add color in late spring and are followed by large, decorative, woody, seedpods. May be susceptible to borer damage; keep a watchful eye on trees. Native to Texas and New Mexico. Canopy coverage: 314 square feet.

### Elaeocarpus decipiens

JAPANESE BLUEBERRY TREE


A large, evergreen tree that evokes a subtropical mood, reaching 30 to 40 feet high and almost as wide. Accepts some afternoon shade. Creates a fair amount of litter, so not a poolside tree. The small, fragrant, white to cream flowers are borne in clusters late spring to summer. Leaves 3 to 5 inches long are bronzy color when new, then turn dark green, and then turn orange or red prior to dropping. Blue-black, olivelike berries follow. Native to China and Japan. Canopy coverage: 1,257 square feet.

Japanese blueberry tree, *Elaeocarpus decipiens*.

## Eucalyptus species

## EUCALYPTUS

Selecting eucalyptus for a home landscape requires careful planning, because many species grow to 60 feet or even higher—much too large for most residences. Be particularly careful when selecting trees if power lines are part of your lot. Encourage deep, wide-spreading roots with deep and wide irrigations, ideally with drip irrigation, or slow-soak with a garden hose.

Texas ebony, *Ebenopsis ebano*.

Silver dollar tree, *Eucalyptus cinerea*.

### Eucalyptus cinerea


SILVER DOLLAR TREE

This is a medium-to-large tree from 20 to 50 feet high and 25 feet wide. It has a tendency to form multiple trunks, which make it attractive when viewed as a silhouette. Gray-green, rounded leaves grow as opposites along the stems. Juvenile leaves are excellent for cut foliage in flower arrangements. Tolerates wind, and can be planted 10 to 15 feet apart as a windbreak. Accepts lawn conditions. Canopy coverage: 491 square feet.

### Eucalyptus microtheca


COOLIBAH

Graceful tree from 20 to 40 feet high and 25 feet wide, but tends to take on a leaning posture unless staked when young. Best results occur when trained as a single trunk. Trunks of older trees eventually become brown and corky. Can be used as a windbreak; branches are somewhat less fragile than other species. Canopy coverage: 491 square feet.

### Eucalyptus papuana


GHOST GUM

Grow this stately eucalyptus for its notable, smooth, snowy white trunk. Grows at a moderate rate, reaching from 20 to 60 feet high and 15 to 30 feet wide, often with multiple trunks. Leaves are leathery, gray to medium green, and pendulous, making it a good specimen tree for the landscape. Canopy coverage: 707 square feet.

### Eucalyptus spathulata


SWAMP MALLEE

Evergreen, compact and handsome, with multiple trunks, also known as swamp mallet. Smooth, reddish to tan, peeling bark adds a sculptural quality. Grows at a moderate rate 15 to 30 feet high with an equal spread. Graceful, ribbonlike leaves 2 to 3 inches long are grayish green. Makes an excellent screen or windbreak. Its size, color and texture allow swamp mallee to blend better with desert vegetation than most other eucalyptus. Tolerates salty, poor soil, and can be planted near lawns. Canopy coverage: 707 square feet.

### Fraxinus uhdei 'Majestic Beauty'


MAJESTIC BEAUTY ASH, EVERGREEN ASH

Vigorous growth, reaching 50 to 60 feet high with 50-foot spread. Strong branching habit. Exceptionally large, compound, glossy, dark green leaves add splendor to this medium-sized, round-headed tree. Evergreen but becomes deciduous when temperatures drop below 30°F. More uniform growth than other ashes and more cold tolerant, but leaves may burn if subjected to hot winds. Deep irrigation helps reduce surface rooting. Parent stock native to streamsides in Mexico. Canopy coverage: 1,963 square feet.

Coolibah, *Eucalyptus microtheca.*

Ghost gum, *Eucalyptus papuana.*

Swamp mallee, *Eucalyptus spathulata.*

## Geijera parviflora


AUSTRALIAN WILLOW

This evergreen, graceful, fine-textured tree grows at a moderate rate, reaching 15 to 25 feet high and 15 to 20 feet wide. Rounded to pyramidal in form, it remains small enough for patios. Plant it for the weeping willow appearance created by the medium green, strap-shaped leaves. Uniform growth at a moderate rate can be accelerated with additional water. Good soil drainage is essential. Native to Australia. Canopy coverage: 314 square feet.

## Havardia mexicana


MEXICAN EBONY

*(Pithecellobium mexicanum)*. Lovely, smooth, gray bark and a naturally rounded form make this a great addition to the landscape. A moderately fast grower, it reaches up to 30 feet high and as wide but is usually much smaller in a low desert climate. Its fine-textured, gray-green foliage is cold deciduous. Creamy yellow puffball flowers appear in spring, followed by ornate woody brown pods. Native to Sonora and Baja California. Canopy coverage: 707 square feet.

## Jacaranda mimosifolia


JACARANDA

*(Jacaranda acutifolia)*. This is an eye-catching, round-headed, semievergreen tree that grows at a moderate to rapid rate 30 to 50 feet high and 15 to 30 feet wide.

Australian willow, *Geijera parviflora*.

Best for parks, commercial use or large residences due to its size. You'll notice it in May and June: Lacy, fern-like, green leaves and large clusters of attractive, lavender-blue flowers bloom in profusion. As flowers drop, they produce a fair amount of litter, so select location with this in mind. Plant in soil with good drainage. Water deeply to reduce development of surface roots but do not overwater. Water weekly in growing season, but only once or twice during dormant winter period. Produces suckers if pruned too heavy. Native to Brazil. Canopy coverage: 707 square feet.

Mexican ebony, *Havardia mexicana*.

Jacaranda, *Jacaranda mimosifolia*.

## Koelreuteria paniculata


GOLDENRAIN TREE

The open, branching form of goldenrain tree produces light shade. It is deciduous, growing to 35 feet high and as wide, likely smaller in the low desert. The yellow flowers are tiny but profuse, blooming in early summer. Papery fruit capsules follow; they are light green then turn brown, lasting into fall. Native to China and Korea. Canopy coverage: 962 square feet.

Also consider *Koelreuteria bipinnata,* Chinese flame tree, similar in size and appearance. Summer flowers are yellow, followed by pods that change from a creamy white to shades of orange and red. Native to China.

## Lagerstroemia indica


CRAPE MYRTLE

Vigorous deciduous tree or shrub that offers year-round interest, admired for its striking clusters of flowers that bloom summer into fall. Can be trained to become a quality tree to 25 feet high and 20 feet wide. Foliage turns bright shades of orange, yellow or red in fall. After leaves drop, the satiny, pale, sculptural bark adds close-up interest. Avoid planting in lawn areas, which can cause plants to develop mildew problems, as will excessive humidity. Many hybrids and cultivars are available in a range of flower colors, including white, pink, red, magenta, lavender and purple. Native to China. Canopy coverage: 314 square feet.

## Leucaena retusa


GOLDEN LEADBALL TREE

A deciduous tree or large shrub to 20 feet high and 15 feet wide. A primary attraction are the spring and summer flowers—yellow-gold balls about 1 inch in diameter hang on the branches like ornaments. Bright green, delicate, lacy leaves give it a subtropical effect. Accepts some shade. Drought tolerant but better appearance with additional summer water. Native to Chihuahuan Desert. Canopy coverage: 177 square feet.

Goldenrain tree, *Koelreuteria paniculata.*

Crape myrtle, *Lagerstroemia indica.*

Golden leadball tree, *Leucaena retusa.*

## Lysiloma watsonii var. thornberi


FEATHER TREE

*(Lysiloma microphylla* var. *thornberi).* Finely divided, fernlike foliage provides a lush, tropical effect. Creates dappled shade—ideal for perennials and small shrubs beneath. By the time plants are 6 to 10 years old, the multitrunk growth can reach 15 to 20 feet, spreading to 15 feet wide. After a spring show of creamy white, puffball flowers, seedpods are numerous enough to create litter in early summer, but are easy to remove. Avoid pruning large branches in summer. Plant in full sun in soil with good drainage. Overwatering during summer can create chlorotic conditions. It can freeze to the ground, but will regrow, usually becoming a large shrub. Be aware plants reseed. Native to Sonora, Mexico. Canopy coverage: 177 square feet.

## Melaleuca quinquenervia


CAJEPUT TREE

Slender, vertical, evergreen tree from 20 to 35 feet high, spreading 10 to 15 feet wide. Bark is white to light brown, thick, and corky in texture and peels off the trunk in spongy sheets. Rich green foliage is graceful, thickly covering the branches. Thin branches as necessary as the tree ages, but do not top. Stands up to strong winds. Slender spikes of creamy white flowers adorn branches in summer. Water deeply to encourage deep rooting. Accepts some shade. Native to Australia. Canopy coverage: 177 square feet.

A related species, *Melaleuca alternifolia,* is the source of "tea tree oil."

Cajeput tree, *Melaleuca quinquenervia.*

Feather tree, *Lysiloma watsonii* var. *thornberi.*

## Olea europaea


FRUITLESS OLIVE

Olive is a time-honored, quality, evergreen tree with an informal, picturesque growth habit. Grows at slow to moderate rate 20 to 30 feet high and as wide, as a standard form, or with multiple trunks. With time, trunks become gnarled, adding to the tree's character. Distinctive, narrow, gray-green leaves reach up to 3 inches long. Olive fruit can be a problem, littering and staining pavement. Pollen production also affects many people with allergies. 'Swan Hill' and 'Wilsonii' are fruitless selections.

Accepts low water applications, but additional moisture produces a more handsome tree. Avoid heavy pruning, especially late spring through summer, which can allow sun to burn the trunk. Keep branches on lower trunks for shade. If trees are pruned up, they will sucker profusely to shade themselves. (Pull off suckers rather than pruning them.) Olives accept almost any soil and endure heat, cold and wind. Native to the Mediterranean. Canopy coverage: 707 square feet.

Fruitless olive, *Olea europaea.*

### Olneya tesota

DESERT IRONWOOD


Just as olive trees create a focal point in the landscape, desert ironwood possesses a similar regal presence, with gray-green foliage and gray trunks with real character. Lavender, pealike flowers give trees an otherworldly glow in April and May, attracting bees in abundance. Slow growing from 25 to 30 feet high and as wide. It requires some patience but the reward of a quality, long-lived tree is worth the wait. Small but sharp thorns on branches can be a safety hazard near walkways as well as when pruning trees. Requires well-drained soil. Native to the Sonoran Desert. Canopy coverage: 707 square feet.

Desert ironwood, *Olneya tesota*.

## Parkinsonia species
## Palo Verde

*(Cercidium* species). These American desert natives add their own personalities to a landscape scene. Formerly classified as *Cercidium, Parkinsonia* are easily recognized due to their blue-green to green bark, naturally occurring multiple trunks and distinctive elegance. Most are wide spreading from 25 to 35 feet with a similar height, which varies according to the species, moisture and soil type. Masses of yellow flowers cover the trees in April and early May. All tolerate extremes of heat, sun and soil type, although they do best in well-drained soils.

### Parkinsonia florida

BLUE PALO VERDE


Blue palo verde is one of the most colorful desert trees. The strong, multitrunk form grows rapidly, developing a spreading canopy to 35 feet high and 30 feet wide, producing filtered shade. Luxuriant, golden yellow flowers appear in profusion March into April. Bark is a striking bluish green. With age, the main trunk darkens to brown. Encourage its natural, angular form and avoid pruning heavily at any one time, which can interrupt growth patterns. Native to the Sonoran Desert. Canopy coverage: 707 square feet.

Blue palo verde, *Parkinsonia florida*.

*Parkinsonia* hybrid 'Desert Museum'.

## Parkinsonia hybrid 'Desert Museum'

DESERT MUSEUM PALO VERDE

This improved and popular *Parkinsonia* is a result of hybridizing work involving *P. florida, P. microphyllum* and *P. aculata* at the Arizona-Sonora Desert Museum in Tucson. Growth pattern of thornless ascending branches produces a substantial structure and strong vertical form. Plants are fast growing, reaching 25 to 30 feet high with a 20- to 25-foot spread. It would definitely make the Star Performer list, except for the tendency of strong winds breaking its limbs. Planting in a protected location offers some prevention. Flowers are rich yellow and are quite profuse during peak spring bloom. It also flowers sporadically during summer with supplemental irrigation. Best planted in deep soil. Canopy coverage: 368 square feet.

## Parkinsonia microphylla

FOOTHILLS PALO VERDE, LITTLE LEAF PALO VERDE

Bark is a distinctive lime-green. It grows slowly to 20 feet high and about 15 feet wide, with a more diminutive and stiffer appearance compared to *Parkinsonia florida*. Tree is semi-deciduous—leaflets drop in cold or drought. Yellow flowers appear April into May. Its slow growth rate can be accelerated by supplying additional moisture. Twiggy growth and low canopy provide shelter for wildlife, which also makes it a fine choice as a background tree or for screening. After young trees are established, selectively thin branches to show off its interesting trunk structure. Consider it as a small patio tree with character. Native to Arizona and Baja California. Canopy coverage: 177 square feet.

## Parkinsonia praecox

PALO BREA, SONORAN PALO VERDE

Grows slowly 15 to 25 feet high and as wide. Vivid yellow flowers in clusters bloom in April into May. Palo brea has a more upright structure and thornier branches than other *Parkinsonia* species, with distinctive angular branches. Bark on trunks and branches remains green, even as tree ages. Occasional deep watering improves appearance. Native to southern Sonora, Mexico. Canopy coverage: 491 square feet.

Palo brea, *Parkinsonia praecox.*

Foothills palo verde, *Parkinsonia microphylla.*

## Phoenix dactylifera

DATE PALM

Date palm is the iconic palm tree of the Coachella Valley. They are large and picturesque, plus produce tasty fruit, but because of their size they are not the right choice for a small garden or home. Plants grow slowly but when mature, reach up to 60 feet high with a trunk 2 to 3 feet in diameter. Even young trees need space—the fronds spread to 25 feet across. Near the trunk, the bases of the feather-shaped leaves have stout thorns. Requires moderate watering throughout summer for trees to look their best. Be aware that fruit drop can be messy, so it is not a smart choice around pools and patios. Native to northern Africa. Canopy coverage: 491 square feet.

*Phoenix roebelenii,* pygmy date palm, is a related species but is much, much smaller in scale, to 4 to 6 feet high. It is excellent in containers and does best with afternoon shade. It can also be grown indoors if given bright light.

## Pinus eldarica

AFGHAN PINE, MONDALE PINE

*(Pinus brutia).* Pines evoke a feeling of the mountains and create a cooling mood. Because their size, color and texture are so different from plants native to desert regions, it is a challenge to blend them effectively into the landscape. Before planting, it may be helpful to visualize how they will integrate with other plants on site.

Afghan pine grows fast in pyramidal fashion 30 to 40 feet high and to 25 feet wide. Accepts heat, severe wind, cold and a variety of soils. In well-drained soil, roots are better able to penetrate, allowing for deep rooting and more prolific growth. Use as an attractive, dense windscreen or featured landscape tree. Tolerates windy conditions. Native to Afghanistan. Canopy coverage: 491 square feet.

Similar in appearance is *Pinus halepensis,* Aleppo pine. Native to the hills of Lebanon, Aleppo pine is susceptible to spider mites, and generally does not tolerate Coachella Valley conditions long term as well as the Afghan pine.

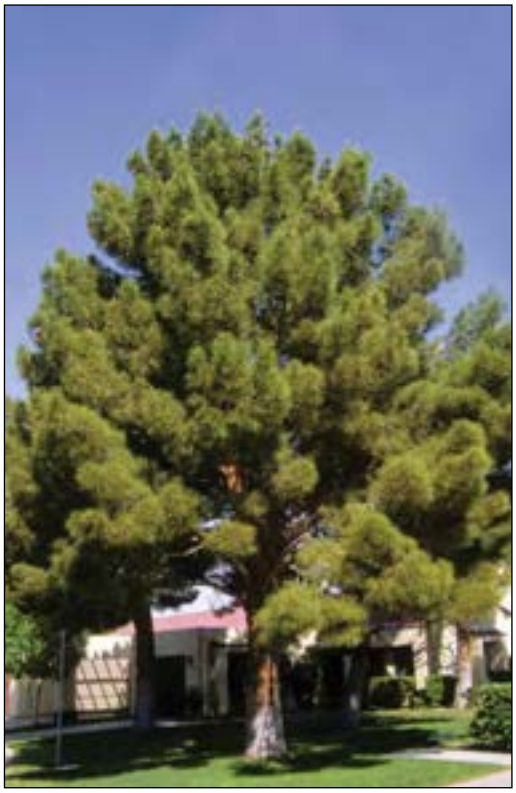
## Pinus pinea

ITALIAN STONE PINE

This pine is broadly conical when young, then becomes spreading and flat-topped (shaped like an umbrella) as it ages. Grows at a slow to moderate rate 25 to 40 feet high, sometimes more, spreading to 40 feet wide. Picturesque trunk and branch structure develop over time. Needles are bright green. This tree produces the edible pignolia nut. Native to southern Europe. Canopy coverage: 1,257 square feet.

Date palm, *Phoenix dactylifera.*

Afghan pine, *Pinus eldarica.*



Italian stone pine, *Pinus pinea.*

### Pistacia chinensis


CHINESE PISTACHE

This is a long-lived tree from 30 to 40 feet high and 30 to 35 feet wide. Grows at a moderate rate, but with time it produces a broad canopy that creates dense shade. Deciduous, bright green, compound leaves turn intense crimson colors in fall. Accepts a wide variety of adverse conditions. Does best with periodic deep soaking of soil around the root zone. Native to China. Canopy coverage: 962 square feet.

### Pistacia lentiscus


MASTIC

A slow-growing, wide-spreading, evergreen tree or large shrub, reaching 15 to 20 feet high with an eventual spread to 20 feet wide. The dense, attractive, bluish green foliage makes it desirable as a background or screen. Flowers are inconspicuous. Tolerates drought, heat and salty soils. Native to the Mediterranean. Canopy coverage: 314 square feet.

Chinese pistache, *Pistacia chinensis*.

Mastic, *Pistacia lentiscus*.

# Prosopis species

## Mesquite

Mesquites offer quite a lot to Coachella Valley gardeners. Their size, form, color and texture are in tune with the desert, helping provide a suitable sense of place. In fact, native mesquites are excellent for residential landscapes. Their quick rate of growth, cooling, sheltering shade and low maintenance make mesquites natural choices. In recent years, the number of selections available and appropriate for residential use has increased. Each has special merit.

### Prosopis chilensis


CHILEAN MESQUITE

This mesquite is admired for its ability to provide fast shade and screening. Trees grow at a rapid rate to 30 feet high and as wide. Young trees need staking and adequate ties to help support heavy top growth. Thin no more than 20 percent of interior growth at any one time to avoid sunburn damage to trunk. Do not plant within 15 feet of walls because roots tend to be shallow. Water deep and wide—at the drip line and beyond—to encourage a deep, extensive root system that will help trees stand up to strong winds. Thorns are variable, but thornless varieties are available. Avoid planting near pools because litter can be a problem throughout the year. Native to Chile. Canopy coverage: 707 square feet.

### Prosopis glandulosa var. glandulosa


HONEY MESQUITE

Less rigid in growth than other mesquites, honey mesquite has a graceful, slightly weeping form that closely resembles California pepper, *Schinus molle*. It grows at a moderate rate from 15 to 30 feet high with an equal spread. Young branches are thorny. Small, bright green leaves are deciduous. Naturally deep-rooted. Native to Chihuahuan Desert and as far north as Oklahoma. Canopy coverage: 707 square feet.

Honey mesquite, *Prosopis glandulosa* var. *glandulosa*.

### Prosopis hybrid Phoenix®

PHOENIX MESQUITE

A hybrid with a number of parents, this is a grafted tree with native honey mesquite rootstock and top growth of South American hybrid mesquite. It grows quickly but not excessively so, reaching 30 feet high and as wide. Features the best of both worlds, dense green foliage without thorns, and with the deep-rooting characteristic of honey mesquite. Canopy coverage: 707 square feet.

### Prosopis pubescens

SCREWBEAN MESQUITE

This deciduous mesquite is known for its unique bean pods, which are borne in clusters and shaped in a unique, spiral fashion. Grow it as a large shrub or small tree, useful as a barrier or security plant due to its small but sharp thorns. Mature size can be up to 30 feet high and as wide, but typically is much smaller. Regular irrigations will increase size and growth rate. Drought tolerant once established; it accepts tough conditions. Native to Sonoran and Chihuahuan deserts in Southwest U.S. Canopy coverage: 707 square feet.

### Prosopis velutina

VELVET MESQUITE

This native mesquite is semi-deciduous, growing to 30 feet high with an equal spread. Foliage is a velvety gray-green. Seedpods are edible and were a staple food of natives. Branches of young trees have small thorns that become less abundant with maturity. With age, trunks take on a gnarled and shaggy appearance, resulting in picturesque trees of great character. Young trees are slow growing and character is more shrublike. Additional water will increase size and growth rate. Native to southeastern Arizona into Texas. Canopy coverage: 707 square feet.

Phoenix mesquite, *Prosopis* Phoenix®

### Prunus cerasifera 'Thunder Cloud'

PURPLE PLUM

Open, rounded, tree 10 to 15 feet high, with a rounded crown spreading 12 to 15 feet wide. Admired for its striking, dark purple, almost black foliage. Deciduous. Pink flowers bloom in spring. Trees sometimes bear fruit in summer. Avoid planting in windy locations. Best where it will receive afternoon shade. Hybrid of parents native to the Mediterranean. Canopy coverage: 177 square feet.

Screwbean mesquite, *Prosopis pubescens.*

Velvet mesquite, *Prosopis velutina.*

Purple plum, *Prunus cerasifera* 'Thunder Cloud'.

## Psorothamnus spinosus

DESERT SMOKE TREE

*(Dalea spinosus.)* This native of the Mojave and Sonoran Desert is often overlooked and may be hard to find, and that is a shame. Native to the Coachella Valley region, you'll likely see them in their natural habitat along desert washes. Plants survive wonderfully without much care other than shaping into tree forms (if desired). A small tree of character, it is suited to today's smaller lots. Unlike many other desert trees, it fills in densely to provide an effective screen. Grows at a slow to moderate rate from 15 feet high and as wide. In late spring the silvery gray, smoky-looking branches are virtually obscured by the striking, fragrant, deep, purple-blue flowers. Appearance is better with some extra water. Canopy coverage: 177 square feet.

Desert smoke tree, *Psorothamnus spinosus.*

## Punica granatum

POMEGRANATE

This is a deciduous small tree or shrub 12 to 20 feet high and to 12 feet wide, sometimes more, with age. Well-adapted to the Coachella Valley. Pomegranate has much to recommend it: bright green leaves, large, orange-red flowers, healthy fruit, plus golden yellow fall foliage. With time, it becomes a great hedge and security barrier plant. Prune when dormant in winter. Provide generous, regular applications of water in summer if fruit is your goal. Otherwise, supply moderate water. Does well in alkaline soils. Accepts some shade. Native to southern Asia. Canopy coverage: 113 square feet.

Many cultivars are available. Some popular selections include 'Wonderful', 'Chico', 'Legrellei' and 'Nana', a dwarf pomegranate, although it is more of an ornamental with small, dry fruits.

Pomegranate, *Punica granatum.*

## Quercus ilex

HOLLY OAK

Excellent, medium-sized evergreen tree from 30 to 50 feet high with an equal spread. A multitude of small, medium green, finely toothed, hollylike leaves provide dense shade. Planted in a row, holly oak makes a good hedge. Planted singly, it is a refined and elegant specimen. Tolerates lawn planting. Native to the Mediterranean. Canopy coverage: 1,963 square feet.

Holly oak, *Quercus ilex.*

## Quercus suber

CORK OAK


An evergreen tree with a broad, rounded crown that produces deep shade. Moderate growth from 25 to 40 feet high with a short trunk. Leaves are lustrous, dark green above and grayish beneath. Pale, thick and deeply furrowed, corky bark adds close-up interest. In certain regions of the world, it is harvested as cork for commercial use. Native to the Mediterranean. Canopy coverage: 1,257 square feet.

## Quercus virginiana

SOUTHERN LIVE OAK


A quality evergreen tree that grows 50 to 60 feet high with an equal spread. Thrives on deep irrigation. 'Heritage' is an improved selection, adapted to desert heat and wind. It grows rapidly, producing impressive branches and trunk. Native to southeastern U.S. Canopy coverage: 2,827 square feet.

*Quercus fusiformis,* escarpment live oak, is very similar and is also recommended.

Cork oak, *Quercus suber.*

## Rhapis excelsa

SLENDER LADY PALM


An exceptionally decorative and rare palm, slender lady palm forms dense clumps of many individual stems 6 to 8 feet high and up to 10 feet wide. Fronds are palmate. Best growth is in bright, indirect light and nutrient-rich soil; it also responds to applications of fertilizer. It makes a fine specimen plant in filtered or afternoon shade near a pool, or in tubs or even a sunny window indoors. Native to Japan. Canopy coverage: 79 square feet.

Southern live oak, *Quercus virginiana.*

Queen palm, *Syagrus romanzoffiana.*

Slender lady palm, *Rhapis excelsa.*

## Rhus lancea


AFRICAN SUMAC

A dense, wide-spreading, evergreen tree with a slightly, weeping or drooping growth habit. Mature trees grow 20 to 25 feet high but may spread to 40 feet or more. A workable tree for a small garden but litter alert: It produces a great deal of litter throughout the year. Reddish stems and shiny, medium green leaves are borne in three slender leaflets. Female plants produce profuse numbers of tan to reddish berries in clusters. Avoid heavy pruning at a single session. Some people are allergic to the tree. Native to South Africa. Canopy coverage: 1,257 square feet.

## Sophora secundiflora


TEXAS MOUNTAIN LAUREL

Small tree or large shrub from 10 to 15 feet high and as wide, with glossy green, evergreen leaves. Clusters of purple, wisterialike flowers bloom in spring and perfume the air with their delightful fragrance. Attractive, grayish white seedpods contain red seeds that are poisonous. Plants have overall great tolerance for desert climates. Accepts almost any well-drained soil. Watch for worm pests that can defoliate new leaf growth; treatment is available. Restrained, compact growth requires minimal pruning. Native to Texas. Canopy coverage: 177 square feet.

Texas mountain laurel, *Sophora secundiflora*.

African sumac, *Rhus lancea*.

Tipu tree, *Tipuana tipu*.

## Syagrus romanzoffiana


QUEEN PALM

*(Arecastrum romanzoffianum)*. Grows with a straight trunk 25 to 40 feet high and to 20 feet wide with graceful, arching, feathery leaves. It responds to regular moisture and fertilizer during warm periods, but apply cautiously. Encouraging too-rapid growth can cause fronds to break. Locate in areas sheltered from strong winds. Protect young trees when temperatures drop below 30°F. Water deeply when sustained high temperatures reach 110°F to 120°F. It is a clean, low-litter plant to have around pools. Native to Brazil. Canopy coverage: 314 square feet.

## Tipuana tipu


TIPU TREE

The mature size of 30 feet high and 40 feet wide is typical but be aware tipu tree can grow much larger. Allow it a little more room to spread to be safe. Its defining feature is the shade it produces, and the profuse numbers of pea-shaped, yellow to gold flowers that bloom late spring into summer. Prune frequently and carefully to control and direct growth. Native to southern Brazil and Bolivia. Canopy coverage: 1,257 square feet.

### Trachycarpus fortunei


WINDMILL PALM

A superior, medium-sized palm with fan-shaped leaves that radiate like a windmill from its compact crown. The trunk is naturally shaggy with hairy black fibers and old leaf bases. Do not remove these because it harms the plant. Grows slowly 15 to 25 feet high, spreading 6 to 8 feet wide. Trunks can be 1 foot in diameter. This palm does best with afternoon shade, and does not tolerate reflected sun such as near a pool. Give regular applications of water and fertilizer during the warm months. Due to its smaller stature, it can be planted in atriums, entryways and even in large containers. Native to China. Canopy coverage: 50 square feet.

### Ulmus parvifolia


EVERGREEN ELM, LITTLE LEAF ELM

This broad, umbrella-shaped tree grows fast to reach 35 feet high and as wide. Plant is semievergreen, dropping its small, dark green leaves and regrowing them over several months from winter to early spring. Bark is an attractive mottled tan and brown. Water deeply to avoid shallow roots, which can become unsightly (even hazardous) on the soil surface. Native to China. Canopy coverage: 962 square feet.

### Ungnadia speciosa


MEXICAN BUCKEYE

This plant is another member of the shrub-or-tree group. Allow branches along the multiple trunks to remain for a large, lush-looking shrub, or prune up for an attractive patio-sized tree. Grows at a moderate rate to reach a mature size of 8 to 12 feet high and wide—larger with optimum conditions. Accepts a range of exposures from reflected sun to partial shade. It is deciduous and provides interest throughout the year: spring flowers are bright pink; the large light green leaves turn golden-yellow for a fall color show. Distinctive three-lobed seedpods follow flowers; seeds are poisonous. Plants look similar to buckeye but they are not related. Native to New Mexico, Texas and northern Mexico. Canopy coverage: 113 square feet.

Windmill palm, *Trachycarpus fortunei*.

Evergreen elm, *Ulmus parvifolia*.

Mexican buckeye, *Ungnadia speciosa*.

### Vitex agnus-castus
CHASTE TREE


Long-lived and slow growing, chaste tree is known to tolerate the heat. Narrow leaves produce a spicy fragrance when crunched underfoot. Plants are deciduous with leaves dropping from branches in fall. Grow as a large shrub or small tree 15 to 25 feet high and as wide. Many cultivars are available. Depending on the selection, lavender, blue or white spikes of flowers bloom in summer, attracting butterflies. Cold hardiness also depends on cultivar seed source. Native to southern Europe. Canopy coverage: 491 square feet.

### Washingtonia filifera
CALIFORNIA FAN PALM


This is the only palm native to California, growing naturally in Palm Canyon and other canyons in the Coachella Valley. Trunks can become massive, reaching 3-1/2 feet in diameter. Large fronds are borne on long leaf stems; the leaves are fringed with coarse white hairs. Accepts the desert heat but young plants prefer some shade. Slower growing than *Washingtonia robusta* (see following), reaching a mature height of 35 to 40 feet, sometimes more, spreading 15 feet. Provide occasional deep watering. Canopy coverage: 177 square feet.

### Washingtonia robusta
MEXICAN FAN PALM


*(Washingtonia gracilis).* This native of Baja California is similar to California fan palm, but its trunk is more slender, usually 15 to 18 inches in diameter. Fronds are smaller with shorter stems and fewer filaments. Mexican fan palm becomes a skyline tree, reaching 50 to 75 feet high, sometimes much higher. Spread is typically 10 feet. Both Mexican fan palm and California fan palm are best suited to open, expansive spaces; their height often cause them to go out of scale in a residential setting. Group only with own species in clumps of plants, and stagger their heights to evoke a natural grove effect. Provide occasional deep watering. It self sows, so watch for invasive plants popping up elsewhere in the landscape. Canopy coverage: 79 square feet.

Chaste tree, *Vitex agnus-castus*.

California fan palm, *Washingtonia filifera*.

Mexican fan palm, *Washingtonia robusta*.

# SHRUBS

Shrubs are similar to trees in that they serve many landscape functions. Use them as specimens, accent plants, space definers, group plantings, hedges, screens, barriers, backdrops and foundation plantings. Shrubs provide shade, fruit, habitat and food for wildlife. Seasonal color and interest also add to their appeal.

Shrubs are of course smaller and lower-growing compared to trees, so we see them in greater detail. They help bring the landscape scale down to human scale, and will "fit" in many more spaces. Although many shrubs have beautiful flowers, some last for just a short period of time. It's better to select shrubs for their shape, form, texture, foliage branching habits and the substance and utility they add to your landscape. As with trees, be sure to select shrubs that have a mature height and width that will reside within the available space.

Photo above: *Tecoma* 'Sunrise'.

## Abutilon palmerii


DESERT ABUTILON,
INDIAN MALLOW

Grows up to 5 feet high and as wide with an upright and open form. Velvety heart-shaped leaves and flowers like hollyhocks lend an almost tropical quality. Plants tolerate hot, dry conditions but soak the root zone every week or so in summer to maintain best appearance. Appreciates afternoon shade. Much less water is needed in the cool seasons of the year. Self sows. Native to Sonoran Desert. Canopy coverage: 20 square feet.

## Ambrosia deltoidea


TRIANGLE LEAF BURSAGE

This small evergreen shrub is primarily used for revegetation and erosion control. It reaches 1 to 2 feet high and as wide, with a naturally rounded form, featuring silvery gray foliage. Moderately rapid growth. Once established it can survive with only an occasional watering, but better appearance with summer watering. Flowers are small and insignificant. A relative of ragweed, some people are allergic to its pollen. Caution: burrs can be a pain, literally, for kids and pets. Native to southern Arizona. Canopy coverage: 3 square feet.

Desert abutilon, *Abutilon palmerii*.

Triangle leaf bursage, *Ambrosia deltoidea*.

## Anisacanthus species


DESERT HONEYSUCKLE

Two *Anisacanthus* species share the common name of desert honeysuckle. Hummingbirds and butterflies flock to the tubular, nectar-filled flowers of both species. Plants are semi-deciduous and excellent for wildlife habitats. They grow 3 to 5 feet high and as wide with a natural, open form. Cut plants back to 12 inches in late winter for renewed growth in spring. Well-drained soil is necessary. Canopy coverage: 20 square feet.

*Anisacanthus quadrifidus* var. *brevifolius* 'Mexican Fire'™ and *A. quadrifidus* var. *wrightii* 'Mexican Flame'™ are grown for their abundant orange flower clusters. Most flowering occurs midsummer until frost. Both are hardy to 10°F. Parents are native to Chihuahuan Desert.

*A. thurberi* produces orange or yellow tubular flowers that bloom in spring and summer. Hardy to 20°F. Native to Arizona and New Mexico.

Desert honeysuckle, *Anisacanthus* species. Inset: 'Mexican Flame'™ *Anisacanthus*.

### Atriplex canescens

FOUR-WING SALTBUSH

This plant is a "must" for the wildlife garden. Birds, especially native quail, appreciate the dense cover and edible seeds it provides. Silvery, blue-green, evergreen leaves are actually covered with microscopic plates of white wax, which helps the plant conserve water. Plants reach 4 to 8 feet high and as wide. Clusters of inconspicuous yellow flowers bloom in summer, followed by golden fruit pods with four wings on them. Well adapted to salty conditions, and effective for erosion control. Native to western North America. Canopy coverage: 50 square feet.

### Buddleia marrubifolia

WOOLLY BUTTERFLY BUSH

Useful as a backdrop to perennial beds, the small, ball-shaped, yellow and orange flowers attract butterflies in summer. Grows to 5 feet high and as wide. The toothed, silvery gray, woolly leaves blend and contrast well with silver- or green-leaved plants such as brittlebush, lavender, red salvia and bougainvillea. Plant in soil with good drainage. Prune in late winter to control or renew plants. Native to the Chihuahuan Desert in Mexico. Canopy coverage: 20 square feet.

### Caesalpinia gilliesii

YELLOW BIRD OF PARADISE

Grows to 6 feet high with an equal spread. Foliage is sparse and feathery, with a growth habit that can become top heavy. Spikes of large, brilliant yellow flowers with showy red stamens are the payoff for growing this plant. Best used as a background behind smaller, fuller plants to hide the bare lower stems. Provides color late spring to fall. Accepts shade but loves the heat. Tolerant of almost any soil. Self sows. Native to Argentina. Canopy coverage: 28 square feet.

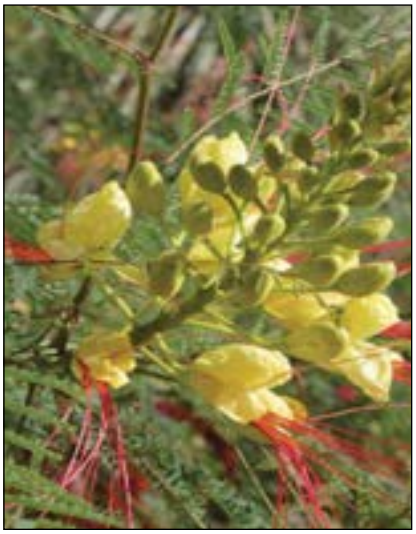
Woolly butterfly bush, *Buddleia marrubifolia*.

### Caesalpinia mexicana

MEXICAN BIRD OF PARADISE

This yellow-flowering species grows rapidly to 10 feet high and as wide. It can be pruned to become a small tree as well. The bloom season comes on slightly later than red bird of paradise, and lasts later in the year. Leaves freeze at 28°F to 30°F, but plant is root-hardy to 18°F. Accepts some shade. Borers may be a problem. Native to Mexico. Canopy coverage: 79 square feet.

Four-wing salt bush, *Atriplex canescens*.



Yellow bird of paradise, *Caesalpinia gilliesii*.

Mexican bird of paradise, *Caesalpinia mexicana*.

## Caesalpinia pulcherrima

RED BIRD OF PARADISE

Brilliant red and yellow flowers bloom from early summer to fall. Considered a workhorse plant for the Coachella Valley. Typically grows 5 to 8 feet high and 6 feet wide, with fine-textured, almost luxuriant leaves, but can get much larger in mild climates. Due to its stature and deciduous nature, use as a background plant. Accepts almost any soil but full sun is required. Cut stems back to about 1-1/2 feet high after winter dormancy, prior to new spring growth. A yellow-flowering selection is also available. Native to the West Indies. Canopy coverage: 28 square feet.

Red bird of paradise, *Caesalpinia pulcherrima.*

## Calliandra californica

BAJA FAIRY DUSTER

The refined, dark green foliage of Baja fairy duster is attractive when combined with other natives or subtropical plants. It grows to 6 feet high and 4 to 6 feet wide with an open form. Delicate, red puffball flowers with long stamens bloom spring into fall; attracting hummingbirds. Prune lightly in late spring to encourage a fuller plant from the ground up. If growth becomes excessive, decrease water. Plant in soil with good drainage. Native to Baja California. Canopy coverage: 28 square feet.

Baja fairy duster, *Calliandra californica.*

## Calliandra eriophylla

PINK FAIRY DUSTER

Produces delicate, pinkish red flower clusters in the spring, complemented by its refined foliage. Mature height and spread is 2 to 3 feet. Similar to *Calliandra californica,* but its growth habit is typically more controlled. Graceful and airy, it is ideal in a natural garden design. Pruning back branches slightly may help create more fullness. Allow plants to grow naturally and they will produce more flowers. A low-water-use plant that prefers full sun and well-drained soil. Native to Sonoran and Chihuahuan deserts. Canopy coverage: 7 square feet.

Pink fairy duster, *Calliandra eriophylla.*

## Calliandra haematocephala


PINK POWDER PUFF

A desirable, hospitable evergreen for an unusual accent planting or trained along a wall. Grows in a sprawling form to 10 feet high and as wide. In winter, a profusion of bright, red-pink stamens shaped like huge powder puffs contrast with rich green, compound leaves. Attracts hummingbirds. Plant in well-drained soil. Accepts some shade. Native to Bolivia. Canopy coverage: 79 square feet.

## Callistemon viminalis 'Little John'


LITTLE JOHN BOTTLEBRUSH

*Callistemon viminalis,* described on page 48, is a commonly grown tree. 'Little John' is an attractive small shrub to 3 feet high and as wide, producing the same trademark bottlebrush flowers on a much smaller plant. The narrow, light green leaves grow up to 6 inches long. Profuse numbers of flowers bloom fall into spring, attracting butterflies and hummingbirds. Acidify the soil on a quarterly schedule to prevent chlorosis and to encourage more flowers. It is a hybrid of Australian parents. Canopy coverage: 7 square feet.

Pink powder puff, *Calliandra haematocephala.*

## Carissa macrocarpa


NATAL PLUM

*(Carissa grandiflora).* This commonly grown shrub reaches up to 8 feet high and as wide. Leaves are an intense deep green, densely arranged on unique, tight, short branches. Makes a suitable hedge but spines can be a hazard. Protect from frost by locating in a warm microclimate such as the south side of a building under a wide overhang. It accepts some shade. Fragrant white flowers are followed by red or purple fruit—as long as plants are not pruned excessively. Many selections are available. Some popular ones include: 'Boxwood Beauty', 'Fancy', 'Green Carpet' and 'Tuttlei'. Native to South Africa. Canopy coverage: 50 square feet.

Little John bottlebrush, *Callistemon viminalis* 'Little John'.

Natal plum, *Carissa macrocarpa.*

## Celtis pallida

DESERT HACKBERRY


From a distance, the overall impact of this shrub is a dense, medium green, rounded form to 8 feet high and 10 feet wide. Up close, the spines reveal themselves. Fragrant yellow flowers bloom in spring, followed by orange berries in fall. The dense growth and spines, combined with edible berries, make this a favorite nesting place for many desert birds. Desert hackberry makes a wonderful informal hedge, screen or backdrop for showier plants. Extra water in spring and summer promotes more flowers and fall fruit. Native to sandy soil locations from west Texas into Arizona. Canopy coverage: 79 square feet.

## Cleome isomeris

BLADDERBUSH


*(Isomeris arborea).* This 4- to 6-foot shrub has light green foliage and bright yellow flowers borne in clusters at the tips of branches. Flowers are a great source of nectar for bees and hummingbirds. After flowers complete bloom, ornamental, inflated green capsules develop with the seeds inside. Plants are easy to grow from seed sown directly in place. Well-drained soil is important. Avoid overwatering during its summer dormancy. Plants may be short-lived. Native to the western Mojave Desert. Canopy coverage: 28 square feet.

Texas olive, *Cordia boissieri.* Inset: *Cordia parvifolia.*

Desert hackberry, *Celtis pallida.*

Bladderbush, *Cleome isomeris.*

## Cordia boissieri

TEXAS OLIVE


This superior shrub or small tree has large, blue-green, leathery leaves and clusters of white flowers to 2-1/2 inches wide. Grows 10 to 12 feet high and spreads to 10 feet wide. Generally a warm-season bloomer, however, flowering extends into winter in the mild climate of the Coachella Valley. Accepts partial shade. Prefers well-drained soil. Remove dead interior branches and lower branches for a tree form. Native to Mexico and the Rio Grande Valley in Texas. Canopy coverage: 79 square feet.

*Cordia parvifolia,* little leaf cordia, is similar to Texas olive. It has smaller leaves and small white flowers to 6 feet high and as wide. Form is more open and airy. Plants can become cold-deciduous below 20°F. Canopy coverage: 28 square feet.

## Cuphea hyssopifolia


FALSE HEATHER,
MEXICAN HEATHER

A compact shrub to 2 feet high and as wide. The tiny, bright green, needlelike leaves look similar to true heather. Small, starlike flowers in pink, purple or white appear during most of the warm season. Often grown as a seasonal hanging basket, it does better planted in the ground, in well-drained soil, where roots appreciate the cooler temperatures. Native to southern Mexico and Guatemala. Canopy coverage: 3 square feet.

## Cuphea llavea


BAT-FACED CUPHEA

Small shrub to 2 feet high and 3 feet wide with crisp, dark green foliage. Blooms spring, summer and fall. Unusual red flowers with purple centers remind one of a bat's face. Provide ample water during warm months, particularly if plants are located in full sun. Best with afternoon shade or filtered shade beneath a canopy tree. This is a good example of a longer-lived, color plant alternative to bedding plant annuals. Canopy coverage: 7 square feet.

## Cycas revoluta


SAGO PALM

*(Cycas ehrenbergia).* A dwarf and compact, palmlike plant, which is actually a cycad. Its numerous, long, dark green leaves are so shiny they appear as if they've been waxed, growing as a crown on top of the short trunk. The thick, heavy stem in small plants resembles a pineapple. Makes a splendid specimen container plant or include in a grouping of similarly sized palms. Reaches choice height of 6 to 10 feet high and 3 to 5 feet wide, but it grows very slowly, taking many years to reach this size. It's important to locate plants in partial filtered shade; protect the first year after planting with shade cloth to shield from the sun. Native to Japan. Canopy coverage: 20 square feet.

Sago palm, *Cycas revoluta.*

False heather, *Cuphea hyssopifolia.*

Bat-faced cuphea, *Cuphea llavea.*

## Dalea frutescens


BLACK DALEA

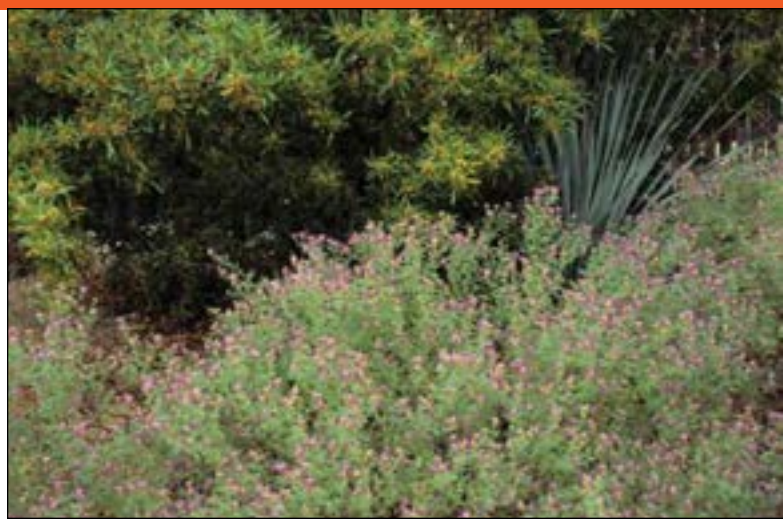
This is one of the many valuable *Dalea* species. Expect compact growth to 3 feet high and 4 feet wide. Partial leaf drop often occurs in extreme cold or during drought. Rose-purple flowers put on a show in fall and winter when most plants have ceased blooming. Lightly prune, maintaining natural form, in spring. Plant in well-drained soil. 'Sierra Negra'™ has more prolific blooms. Native to Chihuahuan Desert. Canopy coverage: 13 square feet.

## Dalea pulchra


INDIGO BUSH, BUSH DALEA

This shrub has contrasting, intertwining, silvery gray leaves with violet-blue flowers from late winter into spring. Grows 3 to 5 feet high and up to 5 feet wide. Adds great interest when combined with other native desert plants. Best in full sun and in well-drained soil. Native to Arizona and northern Sonora, Mexico. Canopy coverage: 20 square feet.

Indigo bush, *Dalea pulchra*.



Black dalea, *Dalea frutescens*.

## Dodonaea viscosa


HOP BUSH

A ruggedly handsome substitute for oleander, or wherever you need a vigorous, fast-growing shrub or screen. Reaches 10 feet high and almost as wide, with bright green, evergreen leaves. Suitable as low windbreak or for screening. Space 4 to 5 feet apart. Will accept some shade and stands up to wind, heat and cold. Flowers are inconspicuous but are followed by showy, pale yellow seedpods that split and blow away. Lightly trim to shape plants (avoid shearing), or allow them to develop their natural form. Be aware that plants can be short-lived, but they are self sowing. Native to Arizona. Canopy coverage: 79 square feet.
'Purpurea', purple hop bush, has bronzy purple leaves and is slightly less cold hardy—to 20°F.

Hop bush, *Dodonaea viscosa*.

## Duranta erecta


SKYFLOWER

This is a large, somewhat sprawling, evergreen shrub, reaching up to 18 feet high and 15 feet wide in optimum conditions. Clusters of purple to lilac flowers drape from the glossy green leaves in late spring. They are followed by yellow to orange, ball-shaped fruits that are poisonous to humans but loved by birds. Some selections have thorns; 'Sweet Memory' is thornless. Native to tropical America. Canopy coverage: 177 square feet.

Skyflower, *Duranta erecta*.

## Encelia farinosa


BRITTLEBUSH, INCIENSO

Brittlebush is an abundant although short-lived shrub in natural desert areas throughout the Sonoran and Mojave deserts. It plays a versatile role in home gardens, particularly in natural designs with other native plants. Evergreen, gray to light green leaves are soft and velvety to the touch, covering the 2- to 3-foot-high plants that spread to 4 feet wide. Bright yellow, daisy-like flowers are borne on tall stems in profuse numbers well above the leaves in spring. After flowering has passed, cut plant back by one-third and water thoroughly for a repeat bloom. Little is required to grow them successfully: well-drained soil, low water and full sun. No need for fertilizer. May die back to the ground during periods of drought, but usually comes back when given moisture. Canopy coverage: 13 square feet.

Brittlebush, *Encelia farinosa*.

## Eremophila maculata var. brevifolia


RED EREMOPHILA

An excellent choice for bright winter color. The dark gray leaves are virtually hidden by the brilliant red flowers January into March. The rest of the year the symmetrical, 4- by 4-foot, dark gray shrub blends with silvery foliaged plants. Grows moderately fast and prefers well-drained soils. Shear plants in April after blooming, but then not again if you want ideal bloom display. Canopy coverage: 13 square feet.

Also try *Eremophila* 'Summertime Blue'™ for its lilac-blue flowers during summer. It will grow in clay soils. Both are native to Australia.

Red eremophila, *Eremophila maculata* var. *brevifolia*.

## Eremophila nivea


EMO BUSH

This is a small shrub, reaching 3 to 4 feet high with an equal width. Attractions include the silvery, hairy stems and leaves, adorned with purple flowers. The bloom period lasts for a long time, beginning in late winter and into summer. Appreciates well-drained soils and open, sunny garden locations. Drought tolerant once established. Native to Australia. Canopy coverage: 13 square feet.

## Ericameria laricifolia


TURPENTINE BUSH

In the fall, the dense, fine-textured, dark green leaves of turpentine bush become blanketed with bright yellow, daisylike flowers. The refined growth can develop into a shrub 2 to 3 feet high and as wide. Best used in masses or groups in out-of-the-way places, on slopes or in combination with other low-water-use plants. Give the foliage a rub between your hands and you can smell its namesake turpentine scent. Native to west Texas, New Mexico, Arizona and Mexico. Canopy coverage: 7 square feet.

## Eriogonum fasciculatum var. polifolium


FLATTOP BUCKWHEAT

A low, rounded, evergreen shrub to l-l/2 feet high, spreading to 2 feet wide. Leaves are extremely fine textured—dark gray-green above, white and woolly below. This delicate foliage is virtually hidden in spring by 2-inch clusters of tiny, white to pale pink flowers. Flowering begins in March and can continue into November if plants receive regular water. Seeds are loved by the lesser goldfinch and other birds. Pruning generally isn't necessary. Does best in well-drained soils—it is native to dry rocky slopes of southeastern California, and into Arizona and Nevada. Canopy coverage: 3 square feet.

Flattop buckwheat, *Eriogonum fasciculatum* var. *polifolium.*

## Fallugia paradoxa


APACHE PLUME

Apache plume grows 3 to 6 feet high and to 4 feet wide. Admired for its graceful, airy, upright, angular branches covered with dark green leaves, as well as its flowers and seedheads. Flowers are l inch across and look similar to single rose blossoms. Seedheads are even more showy, presenting as numerous, silky pink plumes. They adorn plants from May to December, adding long-term interest. Becomes deciduous in cold-winter regions. Locate in full sun to partial shade. Well-drained soil is essential. Native range extends from Utah to Texas south to Mexico. Canopy coverage: 13 square feet.

Turpentine bush, *Ericameria laricifolia.*

Apache plume, *Fallugia paradoxa.*

### Feijoa sellowiana

PINEAPPLE GUAVA


This is a fast-growing, evergreen shrub, reaching 10 to 15 feet high and 10 feet wide. Gray-green leaves are attractive, as are the waxy white flowers with red stamens. Flower petals are edible and are sometimes added to salads. Flowers bloom May through June and are followed by tasty fruit. Fruit quality and quantity is better in cooler climates, and when fruit producing cultivars are grown. Accepts some shade. Native to South America. Canopy coverage: 79 square feet.

### Fraxinus greggii

LITTLE-LEAF ASH


Grows at a moderate rate to 10 feet high and up to 8 feet wide. Leaves are light green to gray-green; bark is gray. It can be trained to become a small tree with a rounded crown. Tolerates heat, alkaline soils and lawn situations. Native to canyon bottoms and alongside streams, so does best with regular water. Inconspicuous spring flowers are pollinated by the wind. Ash are in the same family as olives, and their pollen is troublesome for some. Native from Arizona to Texas. Canopy coverage: 50 square feet.

Little-leaf ash, *Fraxinus greggii.*

Pineapple guava, *Feijoa sellowiana.*

### Guaiacum coulteri

GUAYÁCAN


Intense, blue-purple flowers offer a startling splash of color against the rich, dark green foliage. Flowers appear in spring and can last into midsummer if plants are given a little extra water. The leaves are composed of 6 to l0 tiny leaflets and are borne on twisted, crooked branches covered with smooth, pale gray bark. Prefers well-drained soils. Accepts some shade. Susceptible to hard frosts, growing at a moderate rate to 5 feet high and as wide. In frost-free areas it can reach up to 10 feet high. Native to tropical deciduous thorn scrub of western Mexico. Canopy coverage: 20 square feet.

Guayácan, *Guaiacum coulteri.*

## Hamelia patens


SCARLET BUSH, FIRE BUSH

This fast-growing shrub has fuzzy, 6-inch, gray-green leaves. In areas with frost, plants reach 5 feet high and as wide, but often remain smaller. In frost-free areas in the tropics they can reach an incredible 25 feet in height. Clusters of orange-red, 3/4-inch tubular flowers bloom through summer with regular moisture. Flowers are followed by small dark fruit that are relished by birds. Needs good soil drainage, but tolerant of saline soils. Accepts some shade, but protect from wind and frost. Prune in fall after flowering has ceased. Native to southern Florida and Central America. Canopy coverage: 20 square feet.

## Hyptis emoryi

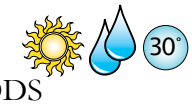

DESERT LAVENDER

The wonderful lavender fragrance of all parts of this shrub makes it an excellent addition to any garden. The powder gray foliage contrasts well with clusters of small, violet-purple flowers that grace the plants from spring through fall. They cling, dried on the stems, through the winter. Becomes an open, upright, vase-shaped, evergreen shrub, reaching 5 to 8 feet high, and if provided with regular moisture, eventually spreading as wide. Plants are winter dormant, and require no water during this season. A great choice for a natural garden. It is an excellent backdrop to perennials, wildflowers or other color plants. Does best in well-drained soil. Native to Sonoran Desert. Canopy coverage: 50 square feet.

Desert lavender, *Hyptis emoryi*.

Scarlet bush, *Hamelia patens*.

## Ixora coccinea




IXORA, FLAME OF THE WOODS

This medium-sized evergreen shrub grows 4 to 6 feet high and 3 to 5 feet wide. Large, glossy, dark green leaves serve as the backdrop for the large, bright red flowers. A yellow-flowering selection is also available. Flowers are most profuse in summer with sporadic bloom the rest of the year. Accepts full sun but best with afternoon or filtered shade in hot desert climates. Where cold hardy, works well as an informal hedge or space definer. May die to the ground with freezing temperatures but regrows the following spring. Native to tropical Asia. Canopy coverage: 20 square feet.

## Juniperus chinensis


JUNIPER

Junipers are available in many different sizes, forms, growth habits and foliage colors, from ground-hugging groundcovers to large shrubs. Research carefully to get the plants you want to fit your use and site. Some will accept partial shade. Some selections to look for include: 'San Jose', one of the best prostrate (low-growing) junipers. 'Pfitzeriana', with handsome, gray-green foliage. Sharp-needled leaves cover arching branches as plant develops into a showy, spreading shrub 6 to 10 feet high and as wide. 'Torulosa', also known as 'Kaizuka', Hollywood juniper, has rich green foliage. Produces an upright, windswept form 10 to 15 feet high.

Canopy coverage varies according to the selection. 'Torulosa', for example, has a canopy coverage of 79 square feet.

Juniper, *Juniperus chinensis* 'Torulosa'.

### Justicia brandegeana


SHRIMP PLANT

*(Beloperone guttata).* Masses of pinkish copper, shrimp-shaped *bracts,* modified leaves, surround small white flowers set off by evergreen, bright green leaves. Plants grow 2 to 3 feet high and as wide, blooming during the warm season. Best in partial shade. Evokes a tropical effect. Can be planted in containers. Cut back cold-damaged branches in early spring to rejuvenate them. Native to Mexico, it has escaped and naturalized in southern Florida. Canopy coverage: 7 square feet.

### Justicia californica


CHUPAROSA

Showy, red, tubular flowers are most profuse in the spring, with sporadic flowers in summer and fall. Sprawling, informal growth to 4 feet high, spreading to 6 feet wide, with small, pale green leaves. Ideal plant for a hummingbird garden or in a natural garden. Cut plants back severely in early spring every two or three years to invigorate growth. A yellow-flowering form is also available. Native to the Sonoran Desert. Canopy coverage: 28 square feet.

### Justicia spicigera


MEXICAN HONEYSUCKLE

Vivid, orange, tubular flowers combine with soft, fuzzy, pale green leaves, creating a luxuriant, subtropical effect. Hummingbirds flock to plants when in bloom during mid- to late spring and into fall, when plants are given regular water. Growth is rounded to upright, 4 feet high and as wide. Tolerates some sun, but grows best in filtered shade, such as beneath tall canopy trees. Native to southern Mexico and into Central America. Canopy coverage: 13 square feet.

Shrimp plant, *Justicia brandegeana.*

### Lantana camara hybrids


LANTANA

Lantana is an evergreen shrub or groundcover. Plants produce masses of color during the warm season, blending with native or introduced dry-climate plants. Rich green leaves cover the thickly branched plants, and emit a pungent scent when crushed. Cut plants

Chuparosa, *Justicia californica.*

Mexican honeysuckle, *Justicia spicigera.*

back severely in early spring every two or three years to renew growth. Native to tropical America.

Selections offer improvements over the species: 'Christine', striking cerise-pink flowers; 'Cream Carpet', cream-colored flowers; 'Dwarf White', velvety white flowers; 'Dwarf Yellow', bright yellow flowers; the popular 'New Gold', golden yellow flowers; 'Radiation', rich, orange-red flowers; 'Spreading Sunset' with vivid, orange-red flowers; 'Spreading Sunshine', abundant, bright yellow flowers; 'Tangerine', produces flowers with a solid tangerine color.

Also see *Lantana montevidensis,* page 93. Canopy coverage varies. 'New Gold', for example, has a canopy coverage of 28 square feet.

Lantana, *Lantana camara*.

### Larrea tridentata


CREOSOTE BUSH

*(Larrea divaricata).* This characteristic shrub of the desert can be seen in abundance throughout low- and high-elevation regions of the desert Southwest. The unique, fresh, clean scent this plant produces after a rain is treasured by desert dwellers. It is one of the most versatile shrubs for a natural garden design, accepting the toughest conditions of intense heat, sun, wind, cold and drought. The olive green, glossy, evergreen foliage can be most useful as a hedge or screen or individual specimen. Creosote is truly maintenance-free. Bees are attracted to small yellow flowers that cover the 5- to 10-foot plants in spring.

To help plants develop deep tap roots, provide new plantings with deep irrigation, but allow the soil to dry between applications. If you have inherited creosote bush on your property, an occasional deep irrigation will cause plants to produce more luxuriant growth. Light pruning may be necessary if plants look unruly. Self sows. Canopy coverage: 79 square feet.

Creosote bush, *Larrea tridentata*.

## Leucophyllum species

### Texas Ranger

This genus of flowering shrubs are at the top of the list of star-performing shrubs in Southwest landscapes. More than a dozen species and selections are available and adapted to a large region, from Texas to California. Plants come in a range of sizes and have evergreen, silvery gray to green foliage and dense, well-rounded growth. Low water use, acceptance of full sun and long flowering seasons are more than enough attributes to use them in abundance in most any garden situation. Each has a unique value that makes it worthy of consideration. Native to the Chihuahuan Desert, most are generally cold hardy to l0°F and have few problems caused by insects or diseases. Good soil drainage is important. Also avoid overwatering.

Allowed to grow naturally, plants take on an informal appearance. Controlling growth by light trimming creates a more dense, hedgelike appearance, but usually results in fewer flowers and higher water use. Avoid pruning in globes or squares. Prune lightly in fall after the flowering season has finished to maintain the plant's form and for a more natural but controlled effect.

## Leucophyllum frutescens

TEXAS RANGER

This is the species that was the first *Leucophyllum* to be brought into cultivation. It grows 6 to 8 feet high and as wide with a rangy, open growth habit. Becomes an excellent screening hedge, and an alternative to oleander. Rose-purple flowers bloom most profusely in midsummer against a backdrop of blue-gray leaves. Native to Texas into Mexico. Canopy coverage: 50 square feet.

'Compacta' develops into a dwarf shrub 3 to 4 feet high. Canopy coverage: 13 square feet. 'Green Cloud',™ 6 to 8 feet high and as wide, has light green foliage. The similar-sized 'White Cloud'™ produces gray foliage and white flowers. 'Silver Cloud'™ has striking, dark violet flowers, excellent in contrast to its silvery, almost white foliage. Native to Texas into Mexico. Canopy coverage: 50 square feet.

Texas ranger, *Leucophyllum frutescens*.

## Leucophyllum laevigatum

CHIHUAHUAN RAIN SAGE

Grows to 4 feet high and as wide, sometimes wider, with light violet flowers that bloom during summer, especially with humidity. Small, wavy, medium green leaves cover the branches, which turn up at the ends. Native to canyon bottoms in the Chihuahuan Desert. Canopy coverage: 13 square feet.

## Leucophyllum langmaniae

CINNAMON SAGE

Grows to 5 feet high and as wide with leaves that are similar to Chihuahuan rain sage but plants have a denser form. Flowers are violet and appear through the summer. 'Lynn's Legacy' produces lavender flowers for a longer period during the warm season. It is not as dependent on changes in humidity that tend to prompt other Texas rangers to bloom. 'Rio Bravo'® also has improved flowering performance. Native to Chihuahuan Desert. Canopy coverage: 20 square feet.

## Leucophyllum pruinosum

SIERRA RANGER

A charming plant with silvery white leaves and deep purple flowers that are the most fragrant of the Texas rangers. Grows 6 to 8 feet high with an equal spread, making it an excellent background plant or screening hedge. 'Sierra Bouquet'™ is an especially striking and fragrant plant—its flowers smell like grape bubblegum. Flowers bloom in summer and fall. Native to the Chihuahuan Desert. Canopy coverage: 50 square feet.'

Chihuahuan rain sage, *Leucophyllum laevigatum*.

Cinnamon sage, *Leucophyllum langmaniae,* 'Lynn's Legacy'.

## Leucophyllum zygophyllum

BLUE RANGER

Grows slowly to 4 feet high and as wide with a naturally rounded form. Leaves are silvery blue-green and are distinctive in that they cup upward. Light blue-violet flowers are attractive and appear intermittently through the warm season. 'Cimmaron'®, with light blue flowers, becomes a compact shrub 3 to 4 feet high and as wide. Canopy coverage: 13 square feet.

Blue ranger, *Leucophyllum zygophyllum.*

## Lycium fremontii

WOLFBERRY

This is a large shrub with a thick array of arching, spreading, spiny branches—ideal habitat for birds and other wildlife. Plants can grow to 10 feet high and as wide, but typically are smaller. The small, succulent, light green leaves grow only to 1 inch long. Plants are cold-deciduous (bare branches in winter) so it's best to locate them on the perimeter of the landscape. Small, ½-inch, tubular, white to lavender flowers are followed by red fruits, another bird attractor. Native to western Arizona, southern California and northern Mexico. Canopy coverage: 79 square feet.

## Maytenus phyllanthoides

MANGLE DULCE

This large evergreen shrub forms a dense, lush screen with minimal care or effort. Grows at a slow to moderate rate to 10 feet high with an equal spread. Bright green, leathery leaves are rounded and fleshy, and are attractive all year long. Inconspicuous spring flowers are followed by small red fruit that add a dash of color and are enjoyed by birds. Accepts some shade. Plants are native to salty soil regions of coastal Texas and Baja. Canopy coverage: 79 square feet.

## Myrtus communis

TRUE MYRTLE

Grown for its aromatic, dark green, glossy leaves, this shrub has white flowers in the spring and summer, followed by dark blue berries. Ideal hedging plant and natural foundation plant to 10 feet high, it also accepts shaping well. Accepts some shade. Native to the eastern Mediterranean. Canopy coverage: 79 square feet. 'Compacta', dwarf myrtle, has smaller leaves and a more compact growth habit to 3 to 4 feet high—ideal for low hedging or foreground planting. Canopy coverage: 13 square feet.

Wolfberry, *Lycium fremontii.*

Mangle dulce, *Maytenus phyllanthoides.*

True myrtle, *Myrtus communis.*

## Nandina domestica


HEAVENLY BAMBOO

This compact, evergreen shrub grows 5 to 8 feet high, spreading about 4 feet wide. It is a highly versatile plant for small areas. Appearance is similar to bamboo, with many vertical stems that display distinctive, bamboo-like green leaves. Foliage may turn brilliant shades of red and orange in fall, depending on extent of exposure to sun and cold. Red berries in winter are also an attraction. Great decorative value in containers. Best with eastern or northern exposure; don't plant on the sunny west side. As plants age, remove old stems to renew growth, otherwise little maintenance required. Dwarf selections are available. Native to India and east Asia. Canopy coverage: 13 square feet.

Heavenly bamboo, *Nandina domestica*.

## Nerium oleander


OLEANDER

Oleander has long been a time-honored plant in the Coachella Valley, highly useful as windbreaks and screens. Plants come in a range of flower colors, growing up to 10 feet high or more and as wide. However, oleander leaf scorch, a bacterial disease, and canker, a bacterial infection, are destroying mature plantings throughout California and the Southwest. Older plants, 20 to 30 years old, are most affected. Currently there is no known cure. At this time it is recommended that other plants be grown.

If you have healthy, existing plantings, continue to maintain them as usual. Prune during warm weather, dipping clippers into a 10 percent bleach solution between cuts. (This helps avoid spreading diseases.) Light, selective pruning exposes the interior of the plant to sunlight, stimulating new flowering wood. Avoid shearing, which reduces flowering wood. All plant parts are poisonous so do not burn wood; the resulting smoke may cause irritation. Native to the Mediterranean region and Asia. Canopy coverage: 79 square feet.

## Olea europaea 'Little Ollie'


LITTLE OLLIE OLIVE

This is a dwarf version of *Olea europaea.* (See page 55.) It grows at a slow to moderate rate to about 6 feet high and as wide, perhaps larger with time. It does not produce fruit. Works well in a large container. Accepts some shade. *Olea* species is native to the Mediterranean. Canopy coverage: 28 square feet.

Oleander, *Nerium oleander.*

Little Ollie olive, *Olea europaea* 'Little Ollie'.

## Perovskia atriplicifolia

RUSSIAN SAGE

This is an underused shrubby perennial that is easy to grow and blends well with *Rosmarinus, Salvia, Encelia* and *Ericameria* species. It tops out at 3 to 4 feet high and as wide. Stems with small, toothed, gray-green leaves are adorned with showy spikes of diminutive lavender flowers in the summer. Selections are available that produce flowers in a range of colors. Well-drained soil and moderate applications of water help ensure vigorous, healthy growth. Space at least 4 feet apart so they have ample room to reach mature height and spread. Cutting plants back severely in early spring renews growth. Native to eastern Iran and northwest India. Canopy coverage: 13 square feet.

## Philadelphus microphyllus

LITTLELEAF MOCK ORANGE

One of the attractions of this plant is its highly fragrant flowers. Small, dark green, oval leaves give this medium-sized deciduous shrub a fine texture. Grows 3 to 5 feet high and as wide, sometimes larger. The 4-petaled flowers are white, blooming primarily in late spring and summer, and remind one of orange blossoms. 'June Bride' is an improved selection with large flowers. Native to Southwest U.S. and Mexico. Canopy coverage: 20 square feet.

## Photinia X fraseri

FRASER PHOTINIA

This cross between *Photinia glabra* and *P. serratifolia* is an evergreen shrub or screen to 6 to 10 feet high and 5 feet wide. A special attraction is the new leaf growth in spring that is a glistening, coppery red on bright red stems. Foliage eventually turns a medium green. Clusters of white blossoms also put on a spring show. More mildew resistant than other *Photinia* species. Native to eastern Asia. Canopy coverage: 20 square feet.

Fraser photinia, *Photinia* X *fraseri*.

Russian sage, *Perovskia atriplicifolia*.

## Prunus caroliniana 'Compacta'

DWARF CHERRY LAUREL

Specially selected strain of Carolina laurel cherry, grown for its tight, compact growth. An evergreen, it grows to 4 feet high and as wide with glossy, deep green leaves. Small, creamy white flowers in March are followed by blackish red berries that attract birds. Best with afternoon shade in the Coachella Valley. Does not accept saline or alkaline soils. Hybrid of parents native to southern Appalachia. Canopy coverage: 13 square feet.

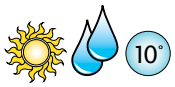
## Pyracantha crenatoserrata

PYRACANTHA, FIRETHORN

*(Pyracantha fortuneana).* A vigorous, thorny, upright shrub to 8 to 12 feet high and 10 feet wide with dark green leaves. Outstanding landscape interest throughout the year due to its clusters of white spring flowers and large, red, long-lasting berries in winter. Accepts espalier training. Many selections are available. 'Graberi' is more erect, with huge clusters of flowers and berries. Native to China. Canopy coverage: 79 square feet.

Pyracantha, *Pyracantha crenatoserrata*.

## Pyracantha koidzumii 'Santa Cruz'




SANTA CRUZ PYRACANTHA

A lower growth habit allows this versatile pyracantha to serve as a groundcover, bank planting or low shrub. Grows from 2 to 4 feet high and up to 6 feet wide. Evergreen, with attractive, glossy, deep green foliage. Covers itself with masses of white flowers in spring followed by orange-red berries in fall. Birds love the berries. Prune upright branches to maintain low-growing form. Native to Taiwan. Canopy coverage: 28 square feet.

Santa Cruz pyracantha, *Pyracantha koidzumii* 'Santa Cruz'.

## Raphiolepis indica


INDIAN HAWTHORN

*(Rhaphiolepis indica).* Evergreen shrub 3 to 4 feet high and 5 to 6 feet wide, with a dense, rounded form. From January to April, the dark green leaves are blanketed by magnificent clusters of flowers. Well-drained soil is required. Accepts partial shade. Avoid overhead watering in sunny locations. Many cultivars are available: 'Ballerina', rosy pink; 'Clara', white; 'Jack Evans', bright pink; 'Spring Rapture', rose-red flowers; 'Springtime', deep pink. Native to southern China. Canopy coverage: 28 square feet.

## Rhus ovata


SUGARBUSH

This large evergreen shrub can also be trained into a small tree. It is more commonly used as a naturalistic screen or hedge, growing slowly to 10 feet high and as wide. Plants can get much larger with time and in optimum conditions. Leaves are glossy, dark green and leathery, and often have a curved shape. Pinkish to cream flowers are borne in clusters in spring. Accepts some shade. Native to Arizona and Baja California. Canopy coverage: 79 square feet.

## Ruellia brittoniana


RUELLIA

Although dwarf forms are available, the full-size plant is a pleasure to grow, reaching 3 to 4 feet high and spreading at least as wide. Given enough room and provided with regular water, it will spread to blanket a planting bed. The long, bronzy green leaves make a nice backdrop to the purple, trumpet-shaped flowers. Each bloom lasts only a single day, but it blooms throughout the warm season. For best appearance, plant where it will receive afternoon shade. Does best in well-drained soils but tolerates clay soils. (Also see *Ruellia brittoniana* 'Katie', page 93.) Native to Mexico. Canopy coverage: 13 square feet.

Indian hawthorn, *Raphiolepis indica.*

Sugarbush, *Rhus ovata.*

Ruellia, *Ruellia brittoniana.*

### Ruellia peninsularis


BAJA RUELLIA,
DESERT RUELLIA

This is an evergreen shrub, growing at a slow to moderate rate to 3 to 4 feet high and as wide. It produces a profusion of blue to purple flowers in late spring and summer. It adapts well to heat, wind and reflected sun, which makes it a good choice as a poolside plant. Plants seldom need pruning except to thin older plants to renew growth. Native to Baja California and Mexico. Canopy coverage: 13 square feet.

Baja ruellia, *Ruellia peninsularis.*

### Russelia equisetiformis


FIRECRACKER PLANT

A dramatic, sprawling shrub to 4 feet high and up to 6 feet wide. When in flower in spring and early summer, it takes center stage in the landscape. The coral-red tubular flowers are profuse, blanketing the long, arching, bright green stems and tiny, scalelike leaves. Plants are relatively cold tender, so locate in a warm, sheltered microclimate. Afternoon shade in hottest locations is also preferred. Plant form makes it a fine choice in a container or raised planter where the long branches and stems can drape and trail. Native to Mexico. Canopy coverage: 28 square feet.

Firecracker plant, *Russelia equisetiformis.*

# Salvia species

## SALVIA

Salvia is a huge genus, with over 900 species worldwide, available in a range of sizes and forms. Some grow as low as l foot high, others up to 8 feet or more. Leaf color varies greatly as well, from silvery white, to olive, to lush deep green. All grow rapidly, and benefit from pruning (cutting back) after flowering has ceased. Hummingbirds love salvias, and many desert gardeners include them in their gardens to attract these fascinating birds. Select species carefully to suit the space you have available. Here are just a few salvias known to do well in the Coachella Valley.

### Salvia clevelandii


CLEVELAND SAGE, CHAPARRAL SAGE

This sage is native to California's rugged coastal chaparral, and is surprisingly well adapted to the tough, low-desert climate. Most plants reach 4 feet high and 5 feet or more wide. Fragrant blue flowers develop in whorls on stems in spring. Deadhead old flower stems in summer after bloom period has passed to renew growth. Well-drained soil recommended. Accepts some shade. Gray-green foliage blends well with many desert natives, and produces a pleasant, musky fragrance when brushed. Plants sometimes scent the air after a vigorous rain. Recently introduced cultivars featuring different shades of purple flowers are available. Canopy coverage: 20 square feet.

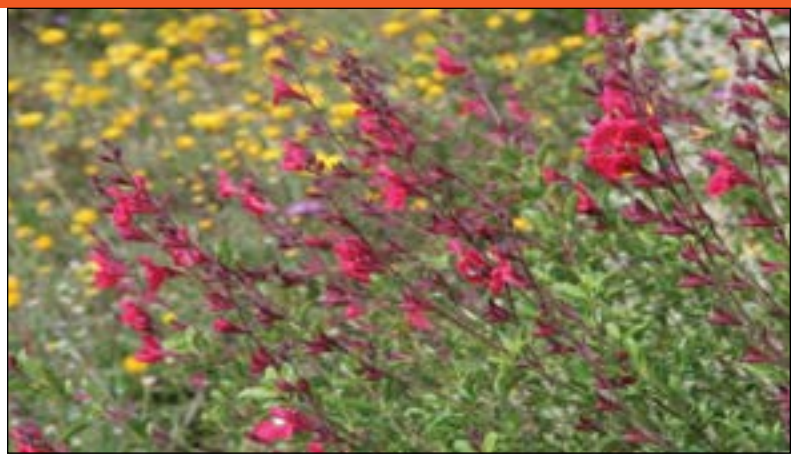
Cleveland sage, *Salvia clevelandii.*

## Salvia greggii

AUTUMN SAGE


This evergreen subshrub grows 2 to 3 feet high and as wide. Effective when planted in masses, the flower spikes in shades of mostly scarlet-red and magenta attract hummingbirds. Finches enjoy the seeds. Afternoon shade is appreciated in low-elevation deserts. A little extra water improves appearance. Prune old flowering wood after blooms cease to create new flush of growth. Native to Texas and Mexico. Canopy coverage: 7 square feet.

Many cultivars are available, including 'Alba', with white flowers, 'Sierra Linda'™, heat tolerant with hot pink flowers, and 'Furman's Red,' drought and cold tolerant with bright red flowers.



Autumn sage, *Salvia greggii.*

## Salvia leucantha

MEXICAN BUSH SAGE


This evergreen shrub grows from 2 to 4 feet high with an often greater spread. Casual, graceful mounding growth habit is well-suited to a natural garden design. Plant in masses for striking flower displays. Long, slender, velvety purple spikes are dramatic, blooming late summer well into fall, sometimes into winter. Cut back plants after flowering in late winter for fresh growth in spring. Best if given afternoon shade. Expect to supply plants with extra water in summer. Native to Mexico. Canopy coverage: 13 square feet.

## Senna artemisioides

FEATHERY SENNA


*(Cassia artemisioides).* Many species within this genus were formerly classified as *Cassia.* Grows rapidly from 4 to 6 feet high and as wide with an upright, rounded form. Makes a fine background for tall perennials or dwarf shrubs. The evergreen, gray-green, feathery leaves blend perfectly with the fragrant yellow flowers that appear late winter and spring. Remove seedpods that follow flowers for a neater appearance. Pods have been used medicinally for eons, but some species are toxic. Prune lightly in fall or in cool weather following flowering. Native to Australia. Canopy coverage: 28 square feet.

## Senna wislizenii

SHRUBBY SENNA


*(Cassia wislizenii).* Stiff, gray-green, l-inch leaves are winter deciduous. Spring growth has tinge of bronze that creates a striking effect. Grows 6 feet high and 8 feet wide. Bright yellow flower clusters bloom June to September. This is a tough plant that tolerates salinity, alkalinity, some flooding and even neglect. Plant in background where loss of leaves in winter is not noticeable. Early growth is slow, but after a season or two plants develop more vigor. Native to Sonoran and Chihuahuan deserts. Canopy coverage: 50 square feet.

Mexican bush sage, *Salvia leucantha.*

Feathery senna, *Senna artemisioides.*

Shrubby senna, *Senna wislizenii.*

## Simmondsia chinensis

JOJOBA

This distinctive shrub is native to the Sonoran Desert, growing 4 to 8 feet high with an equal spread. Gray-green, leathery, evergreen leaves are dense, producing mounding growth adapted to informal and formal designs. Use as a foundation plant, hedge (accepts some shearing), screen or background shrub. Male and female flowers are borne on different plants, so both must be present for the female to produce the seeds, which have many commercial uses. Little or no pruning required. Plant in well-drained soil. Canopy coverage: 50 square feet.

Jojoba, *Simmondsia chinensis*.

## Tagetes lemmonii

MOUNTAIN MARIGOLD

This mounding shrub from 3 to 4 feet high and as wide can be recognized by its golden yellow, daisylike flowers that develop in late fall. If not damaged by cold, flowering continues into spring. Finely divided, light green foliage is strongly aromatic. Cut foliage back by half in early summer to develop sturdy growth to support flowers. Looks better with a little additional water in summer. Native to southeastern Arizona. Canopy coverage: 13 square feet.

## Tecoma stans

YELLOW TRUMPET FLOWER

*(Stenolobium stans).* Large, vigorous plant useful as shrub, espalier or background. In warm microclimates with time and training, it can become a small tree with a potential to reach 15 to 20 feet high. Typically, however, it is grown as a large shrub or screen to 10 feet high and 8 feet wide, sometimes more with optimum conditions. Yellow clusters of trumpet-shaped flowers adorn the plant from June to February. Provide full sun and heat, with moderate water. Prune to control the vigorous growth. Native to Mexico and West Indies. Canopy coverage: 50 square feet.

*Tecoma* 'Orange Jubilee' is similar in size and form but produces an abundance of bright orange, tubular flowers. 'Sunrise'™ features flowers that are striking copper and yellow. See photo, page 66.

## Tecomaria capensis

CAPE HONEYSUCKLE

Large, upright, evergreen shrub 6 to 10 feet high and as wide. The flexible stems can also be trained as a spreading, non-climbing vine 15 to 20 feet long. Grown for its glossy green leaves and brilliant clusters of orange-red, trumpet-shaped flowers that bloom in winter and spring. This is a tough plant that adapts to a range of growing conditions; better with afternoon shade in low desert regions. Rapid growth rate requires pruning to control during the warm season, which the plant accepts without problems. Recovers rapidly in spring if damaged by frost. Native to South Africa. Canopy coverage: 79 square feet.

Mountain marigold, *Tagetes lemmonii*.

Yellow trumpet flower, *Tecoma stans*.

Cape honeysuckle, *Tecomaria capensis*.

## Teucrium fruticans

BUSH GERMANDER

Grows as a substantial evergreen shrub to 8 feet high and as wide, sometimes wider. Blue flowers form spikes at the ends of branches in summer and fall. Leaves are gray-green on top and silvery white underneath, but the plant presents an overall silvery effect. 'Azureum' ('Azurea') is smaller to 4 feet high and 5 feet wide with flowers that are a deeper blue. Drought and heat tolerant once established. Native to the Mediterranean. Canopy coverage: 50 square feet.

## Thevetia peruviana

LUCKY NUT, YELLOW OLEANDER

In warm microclimates, this shrub can be pruned to become a small, umbrella-shaped tree from 15 to 20 feet high and 10 to 15 feet wide. It is more commonly grown as a large shrub to 8 feet high and as wide. Strap-shaped leaves 3 to 6 inches long and 1/2 inch wide are a rich, yellowish green. Foliage is dense and provides an excellent backdrop to the flowers. Yellow or peach-colored, trumpet-shaped flowers to 3 inches in diameter are mildly fragrant. They adorn the plant spring into fall—year-round in mild years. Soak the root zone deeply every week or two in summer for best performance. Prune to remove frost-damaged stems in early spring, but avoid contact with the milky sap. It and other plant parts are poisonous. Native to tropical America. Canopy coverage: 177 square feet.

Bush germander, *Teucrium fruticans*.

## Vauquelinia californica

ARIZONA ROSEWOOD

Large evergreen shrub to small tree with one to several trunks. Grows at a moderate rate 10 to 15 feet high, spreading from 5 to 15 feet wide. Linear, leathery leaves up to 4 inches long are dark green above and velvety gray beneath. Large clusters of small white flowers appear on branch tips in late spring. This is a rugged and enduring plant with rich-textured foliage and an ornamental character. An excellent alternative to oleander. Native to Baja California and Arizona. Canopy coverage: 177 square feet.

Lucky nut, *Thevetia peruviana*.

Arizona rosewood, *Vauquelinia californica*.

## Viguiera deltoidea

GOLDEN EYE

Outstanding small flowering shrub to 3 feet high and as wide. The grayish green leaves are covered with dense hairs, giving them an interesting texture. Conspicuous, yellow, daisylike flowers offer bright splashes of color from spring into summer. Seeds are enjoyed by birds. Native to the Sonoran Desert. Canopy coverage: 7 square feet.

## Vitex trifolia

ARABIAN LILAC

Grows to become a large, attractive, evergreen shrub or small tree to 10 to 15 feet high and as wide. May become deciduous for a short time when cold temperatures drop to 28°F but recovers quickly. Grows rapidly—be sure to give it enough room for mature spread. Lavender-purple flowers bloom in clusters during summer and fall. Accepts some shade—afternoon shade is actually preferred. Trim back to encourage new fresh growth. 'Purpurea' is the selection of choice; its leaves have showy purple undersides. Also see chaste tree, *Vitex agnus-castus,* page 65. Native to Australia. Canopy coverage: 177 square feet.

## Xylosma congestum

XYLOSMA

(*Xylosma senticosum).* This medium-sized evergreen shrub grows 6 to 10 feet high and as wide. Time-honored and versatile, it can also be grown as a multiple-trunked tree, espalier, screen or clipped hedge. Arching branches are attractive on upright growth habit. New foliage has reddish tint, which then matures into an attractive, glossy light green. Flowers are insignificant. Easy to control and accepts trimming well. Accepts some shade. Native to China. Canopy coverage: 79 square feet.

Golden eye, *Viguiera deltoidea.*

## Zizyphus obtusifolia

GRAYTHORN

This is a deciduous shrub best suited to the perimeter of the landscape. It is hard-working and utilitarian, providing security as a barrier plant due to its large thorns that arm its branches. It grows slowly to 6 feet high, spreading as wide, sometimes wider. Leaves are gray-green. The cream-colored flowers that bloom in early summer are not too showy, but the bluish black, pea-sized fruits that follow are bird magnets. This food source and thorny habitat make graythorn an appealing home to wildlife. Native to southwest U.S. and Mexico. Canopy coverage: 28 square feet.

Xylosma, *Xylosma congestum.*

Graythorn, *Zizyphus obtusifolia.*

# GROUNDCOVERS

Groundcovers are the problem solvers. They spread over the soil surface, covering the ground with a carpet of foliage and flowers. They shade and insulate the soil, reducing loss of moisture. Planted on slopes and banks, they help reduce soil erosion. As a landscape element, groundcovers can be a bold statement on their own, or unify other plants in the landscape. Groundcovers are available in different growth habits. They clump, mound, creep or trail. Clumping groundcovers form *upward-reaching* clumps. Mounding forms create *downward-reachin*g clumps. The foliage of creeping forms stiffly hug the ground, while trailing forms are relaxed. Trailing groundcovers are among the best choices to grow in planters and containers, where they add interest by draping over the edges. Photo above: *Lantana montevidensis*.

## Acacia redolens 'Desert Carpet'®

PROSTRATE ACACIA

Generally reaches 1-1/2 to 2 feet high and can spread 8 to 10 feet wide with a more prostrate growth habit compared to the species. Some mounding occurs at crown. Remove vertical growth shoots as they occur. Yellow puffball flowers bloom in spring. Provides rapid coverage on slopes and for erosion control. Native to Australia. Canopy coverage: 79 square feet.

## Baccharis X 'Starn'

PROSTRATE DESERT BROOM

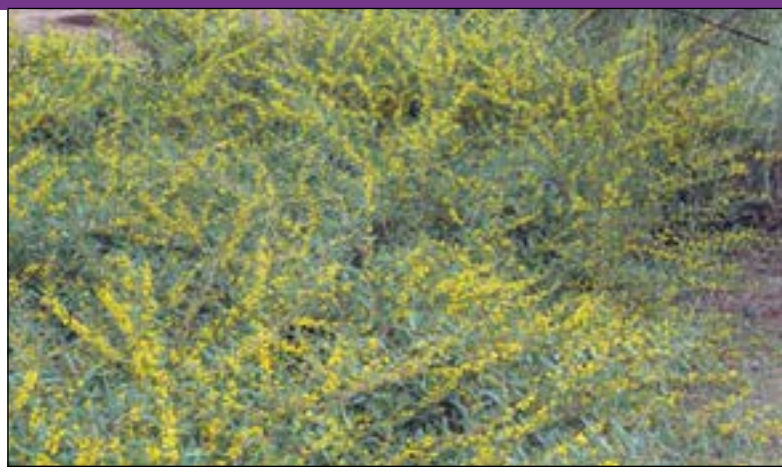
A low-growing, wide-spreading hybrid between *Baccharis sarothroides* and *B. pilularis*. 'Starn' is a male selection, which means plants do not produce seeds and cottony seed fluff. Grows well under both dry and moist conditions, roots deeply on slopes to prevent erosion and presents a uniform, attractive, year-round appearance. Grows 2 to 3 feet high, spreading 4 to 5 feet wide. Plant 2 to 3 feet apart for groundcover. After plants are established, cut them back in winter to early spring to control and renew growth. Native to southwest U.S. Canopy coverage: 20 square feet.

## Calylophus hartwegii

CALYLOPHUS

This is a clumping groundcover that produces masses of yellow flowers up to 2 inches wide. Blooms in spring, summer and into fall. Grows 1 to 1-1/2 feet high and spreads to 2 feet wide. Leaves are narrow and bright green. Attractive when tucked in among boulders or massed in clusters. Plant in soil that has good drainage. Cut back to 8 inches high in fall after blooming ceases to reshape and renew plant for spring growth. Plants become dormant in winter. Native to southeastern Arizona. Canopy coverage: 3 square feet.

Prostrate desert broom, *Baccharis* X 'Starn'.



Prostrate acacia, *Acacia redolens* 'Desert Carpet'®.

## Chrysactinia mexicana

DAMIANITA

This is a low, clumping, evergreen groundcover with a slow growth rate. Damianita bears solid yellow, daisy-like flowers from spring into fall; flowers are more prolific with weekly watering. Plants grow 1 to 2 feet high with an equal spread. After the long flowering season, lightly prune spent flowers to improve appearance. Plant in soil with good drainage. Native to west Texas into New Mexico. Canopy coverage: 3 square feet.

Damianita, *Chrysactinia mexicana*.

Calylophus, *Calylophus hartwegii*.

### Convolvulus cneorum


SILVER BUSH MORNING GLORY

Dwarf, compact, evergreen shrub 2 to 3 feet high and 3 feet wide, with soft silvery foliage. Masses of 1-inch, round, white to pink flowers bloom late spring and summer. Plants located in full sun have full, dense growth; in partial shade the form is more open. Plant in well-drained soil. Native to southern Europe. Canopy coverage: 7 square feet.

### Convolvulus mauritanicus


GROUND MORNING GLORY

This trailing, evergreen perennial grows fast to 1 to 1-1/2 feet high, spreading 2 feet wide. Small, round, gray-green leaves are covered with 1-inch-wide, lavender-blue flowers all summer. Plant in full sun only. Requires soil with good drainage. Trim plants back in winter to renew. Native to Africa. Canopy coverage: 3 square feet.

### Dalea capitata


GOLDEN DALEA

This is a refined, creeping groundcover with small, fine-textured, bright green leaves. Can grow to about 1 foot high, spreading to 3 feet wide. Excellent in small planters or in a rock garden. Best with filtered sun. Golden blooms cover plants in spring and again in fall. It can look less than attractive when dormant in winter. Cut back in late winter prior to new spring growth to rejuvenate. Native to the Chihuahuan Desert. 'Sierra Gold'® tends to be a more prolific bloomer. Canopy coverage: 7 square feet.

Silver bush morning glory, *Convolvulus cneorum.*

### Dalea greggii


TRAILING INDIGO BUSH

This Chihuahuan Desert native is admired by gardeners seeking a low-water, low-maintenance groundcover. Plants grow from 1 to 1-1/2 feet high with foliage that remains a handsome gray to gray-green all year long. Dainty purple flowers bloom in spring. A single plant can spread an incredible 10 to 15 feet in diameter. Little pruning is required unless plants are located in small spaces or along curbs or walks. Take this spread into account when planting. Once established, water need is low. Growth is more vigorous with moderate water. It's an ideal groundcover for erosion control. Plantings can become woody with time. Canopy coverage: 177 square feet.

### Gazania rigens leucolaena


TRAILING GAZANIA

*(Gazania leucolaena).* A plant with clean, silvery green leaves, spreading rapidly to form an attractive, clumping

Ground morning glory, *Convolvulus mauritanicus.*

Golden dalea, *Dalea capitata.*

Trailing indigo bush, *Dalea greggii.*

cover. Grows 6 to 10 inches high, spreading up to 2 feet wide. Daisylike flowers in shades of yellows and oranges are borne in profusion practically every month of the year. Useful on banks for erosion control. Space 1-1/2 to 2 feet apart. Accepts some shade.; better with afternoon shade. Native to South Africa. Canopy coverage: 3 square feet.

## Glandularia peruviana


PERUVIAN VERBENA

*(Verbena puruviana).* Forms a low, dense, evergreen mat of dark green leaves 4 to 16 inches high and up to 3 feet wide. Plant in full sun, 18 inches apart for groundcover. Puts on spectacular displays of brilliant, crimson-red or pink flowers spring through fall. Look for 'Lipstick', purple flowers; 'Red', red flowers; 'St. Paul', pink flowers. Native to South America. Canopy coverage: 7 square feet.

## Glandularia pulchella

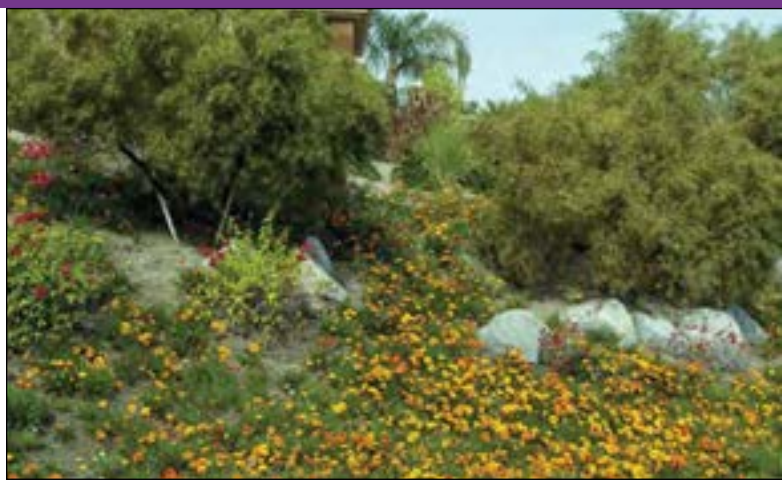

MOSS VERBENA

*(Verbena tenuisecta, V. pulchella).* Low-growing groundcover verbena to 1 foot high, spreading to 3 feet wide. Fine-textured dark green leaves serve as background to clusters of purple flowers that bloom spring to fall. Attracts butterflies. Native to tropical America. Canopy coverage: 7 square feet.

## Glandularia rigida


SANDPAPER VERBENA

*(Verbena rigida).* A vigorous grower from 1- to 1-1/2 feet high and 3 feet wide with dark green, rough-toothed leaves. Stems support clusters of lilac to purple-blue flowers in summer and fall. Like most verbenas, plants perform better if their leaves remain dry. Irrigate with drip system rather than overhead sprinklers. Native to South America. Canopy coverage: 7 square feet.



Trailing gazania, *Gazania rigens leucolaena.*

## Lantana montevidensis


TRAILING LANTANA

Clumping, rapid-growing and free-blooming groundcover from 1-1/2 to 2 feet high, spreading to 3 feet wide. Stems are covered with small lavender flowers during the warm season. If damaged by frost, prune in late winter and plants will come back quickly in the spring. Ideal bank cover, especially on sunny slopes. Space plants 1-1/2 to 2 feet apart for groundcover. Native to South America. Canopy coverage: 7 square feet.

'Gold Mound', a hybrid introduction from Texas A&M University, has rich gold flowers and does not produce seeds. Many other hybrids are available; check locally.

Moss verbena, *Glandularia pulchella.*

Sandpaper verbena, *Glandularia rigida.*

Trailing lantana, *Lantana montevidensis.*

## Myoporum parvifolium


MYOPORUM

Myoporum is tough, hardy and fast-growing, although it does have some shortcomings. It can be short-lived and suffer from dieback in spots. It grows just 3 to 4 inches high, spreading wide to 6 to 9 feet. Bright green, 1-inch leaves with white flowers in summer produce a cooling effect. Branches root as they spread. Best with morning sun—an eastern exposure. Demands well-drained soil. Works well as a cover on slopes and banks, but does not tolerate traffic. Native to Australia. Canopy coverage: 64 square feet.

Myoporum, *Myoporum parvifolium*.

## Oenothera berlandieri


MEXICAN EVENING PRIMROSE

This plant makes a colorful, upright groundcover for small spaces. Invasive alert: This is an aggressive plant that spreads by underground runners. It will happily invade nearby plantings, particularly those receiving regular irrigation. It is highly recommended to plant only where it can be contained. Grows to 1 foot high and spreads to 4 feet wide with 1-1/2-inch, rose-pink blossoms that are abundant late spring into summer. Cut back prior to bloom in late winter, then again after flowering ceases for best performance. Native to the Chihuahuan Desert. Canopy coverage: 13 square feet.

## Oenothera stubbei


CHIHUAHUAN PRIMROSE,
SALTILLO PRIMROSE

(*Oenothera drummondii).* In past years, this plant was incorrectly labeled *Oenothera drummondii,* and sold as Baja primrose. It is an evergreen groundcover that reaches 6 inches high and spreads to about 3 feet wide when given regular moisture. Buttery yellow flowers to 3 inches across open in evening and fade the next morning. It flowers throughout the year, but heaviest in spring. Spreads by underground runners, making it suited for erosion control. Best in partial shade to half-day of full sun. Native to the Chihuahuan Desert of northeastern Mexico. Canopy coverage: 7 square feet.

## Rosmarinus officinalis 'Prostratus'


PROSTRATE ROSEMARY

Prostrate rosemary can be clumping, mounding, creeping or trailing, depending on the selection. In addition, upright forms grow as shrubs up to 6 feet tall. Select cultivars carefully to fit the purpose and garden space. All forms of rosemary can be used as the culinary herb. Native to the Mediterranean.

'Prostratus' spreads 4 to 8 feet and remains less than 2 feet high. Small, light blue to violet flowers are profuse in early spring. Many recent introductions are available. Some have broader leaves, such as 'Miss Jessup'. Others have brighter colored flowers such as 'Collingwood Ingram'. 'Huntington Carpet' is a particularly low-growing selection that retains foliage in the center of the plant better than other creeping forms. Canopy coverage: up to 50 square feet.

Mexican evening primrose, *Oenothera berlandieri*.

Chihuahuan primrose, *Oenothera stubbei*.

### Ruellia brittoniana 'Katie'


DWARF RUELLIA

This dwarf herbaceous plant grows to just 1 foot high, spreading in a mounding form by underground runners to 2 feet wide. Blue, bell-shaped flowers to 2 inches across bloom summer into fall, set off by medium green leaves 4 to 6 inches long. Can be used in containers, as a small-area groundcover or as a filler beneath taller plants. Spreads by rhizomes. Native to Mexico. Canopy coverage: 3 square feet.

Dwarf ruellia, *Ruellia brittoniana* 'Katie'.

### Teucrium chamaedrys 'Prostratum'


CREEPING GERMANDER

Like rosemary, this herb can be upright and bushy, or creeping. Be sure to purchase the creeping form if you want a groundcover. Unlike rosemary, the leaves are bright glossy green and rounded, and not at all needle-like. Creeping germander spreads rapidly, forming a thick cover less than 1 foot high and spreading to 3 feet wide. Plants root deeply and make an excellent soil binder. Plant 12 to 15 inches apart. Spikes of attractive, rosy lavender flowers bloom in spring and summer. Native to the Mediterranean. Canopy coverage: 7 square feet.

Creeping germander, *Teucrium chamaedrys* 'Prostratum'.

### Wedelia trilobata


YELLOW DOT

A fast-growing, trailing groundcover to 1-1/2 feet high and 6 feet wide. Glossy, dark green leaves make an excellent backdrop to the small, golden yellow, daisylike flowers that cover the plant during the warm season. Locate carefully—this plant can be an aggressive grower if provided with regular moisture. Once established, water deeply only once a month in summer. Although yellow dot will grow in full shade, plants produce more flowers in full sun. Finches flock to the seeds. Native to Central and South America. Canopy coverage: 28 square feet.

Also consider *Wedelia texana*. It grows to 3 feet high and as wide with flowers similar to yellow dot, blooming from spring into fall. Native to Texas.

Prostrate rosemary, *Rosmarinus officinalis* 'Prostratus'.

Yellow dot, *Wedelia trilobata*.

# VINES

Vines are versatile. Plant them for their visually restful green leaves, or for shade, screening, overhead protection and the pure beauty of their flowers. Because they require little root space and occupy the vertical dimension, they are ideal for today's small home lots. Many species are fast growing, and if provided a proper structure to climb on, a single vine can provide as much shade as a large tree—all within a few years.

When considering vines, it's important to be aware of the different methods in which they climb. Some do not climb at all, and must be tied in place. Others are self-climbing, with tendrils, twining stems, grasping rootlets or a combination of methods. If you have stucco walls, avoid plants that climb with rootlets. They may cause serious damage. Also refer to the plants in Groundcovers, pages 90 to 95. Many make capable vines. Photo above: *Antigonon leptopus*.

## Antigonon leptopus


QUEEN'S WREATH,
CORAL VINE

In its native habitat, this Sonoran Desert native is usually found growing in canyons. It is a rapid-growing, twining climber, the stems to 30 feet long, providing quick, attractive cover. Leaves are bright green, large and heart-shaped. Queen's wreath blooms profusely with large clusters of bright pink flowers with deeper pink centers. Flowers attract bees. Plant goes dormant and freezes to the ground when temperatures drop below 32°F. It regrows from roots when warm temperatures return in spring. If very low temperatures are expected, protect roots with a deep layer of mulch. Canopy coverage: 707 square feet. 'Baja Red' produces bright red flowers. See photo opposite page.

## Bougainvillea species


BOUGAINVILLEA

*Bougainvillea* species are among the most-popular "workhorse" plants in the Coachella Valley. Shrub and vining forms produce volumes of color from their *bracts*—the modified leaves that surround the actual, tiny white flowers. In frost-free areas plants can grow to 40 feet high and as wide. Select a warm microclimate for a planting site because bougainvillea is relatively frost-tender. If nipped by frost, wait until spring and new growth emerges to remove damaged stems. Plants produce a lot of litter, so avoid planting near pools. After young plants are established, keep bougainvillea on the dry side, which surprisingly encourages plants to produce more flowers. Originally native to South America. Numerous cultivars are available in a wide range of colors. Canopy coverage: 707 square feet, depending upon selection grown.

Bougainvillea, *Bougainvillea* species.

Trumpet vine, *Campsis radicans*.

## Campsis radicans


TRUMPET VINE

This native of the southeast U.S. is tolerant of the harsh summer growing conditions in the Coachella Valley. It is vigorous and self-climbing to 25 feet or more high and wide. The dark green leaves are deciduous in winter. Clusters of 3-inch, orange or red flowers bloom summer and fall and are pollinated by hummingbirds. Rapid growth rate. Use as a color accent, shade or screening. It has a coarse texture so is best appreciated from a distance. Preferred exposure is partial shade. Provide regular water to maintain flowers and dense foliage. Canopy coverage: 368 square feet.

## Clytostoma callistegioides


LAVENDER TRUMPET VINE

*(Bignonia violacea, B. speciosa).* This evergreen vine accepts sun or shade exposures. Pale lavender to violet, trumpet-shaped flowers 3 inches long bloom in spring and summer, set off by glossy green leaves. It climbs by tendrils, then terminal shoots cascade downward for a curtainlike effect. Plants can spread to 15 to 25 feet, sometimes more. Prune in late winter to control and to renew plants. Native to Brazil. Canopy coverage: 368 square feet.

Lavender trumpet vine, *Clytostoma callistegioides*.

### Gelsemium sempervirens


CAROLINA JESSAMINE

An evergreen, twining vine with rich green leaves. Climbs to about 20 feet, but does require support. Profusion of trumpet-shaped, bright yellow, fragrant flowers bloom in late winter to early spring. Does best in partial shade in the Coachella Valley. Cut back severely if it becomes too heavy. All plant parts are poisonous. Native to southeastern U.S. Canopy coverage: 314 square feet.

### Hardenbergia violacea


LILAC VINE

An evergreen vine with long, narrow, dark green leaves. Bark is a rich, cinnamon brown. Climbs by twining to 10 feet in just one year, but requires support. Dense clusters of bright lilac-purple flowers that look like sweet peas bloom in late winter to early spring. Wonderful evergreen cover on arbors, especially as it ages and the richly colored bark gets to show off. Accepts some shade. Cultivars are available in shades of white, pink and blue. Native to Australia. Canopy coverage: 79 square feet.

### Jasminum mesnyi


PRIMROSE JASMINE

*(Jasminum primulinum)*. This is a tough, fast-growing, shrubby vine, reaching to 10 feet in the first year, with medium green leaves and large yellow flowers that bloom midwinter into early spring. Growth is sprawling, but stems can be tied onto trellises. Controls erosion on banks, cascading down them. Left alone (no pruning), it develops into a large, fountain-shaped shrub. Accepts some shade. Native to western China. Canopy coverage: 79 square feet.

Carolina jessamine, *Gelsemium sempervirens*.

### Lonicera japonica 'Halliana'


HALL'S HONEYSUCKLE

A versatile, vigorous, twining, evergreen vine that is occasionally grown as a rampant groundcover. Produces fast cover on fences and trellises, reaching up to 25 feet. Renew growth by cutting plants back severely in late winter (prior to new growth) about every other year. Highly fragrant flowers are pure white then quickly age to golden yellow. They are most profuse in spring and bloom sporadically in summer. Medium green foliage. Accepts full sun to partial shade. Canopy coverage: 368 square feet.

Lilac vine, *Hardenbergia violacea*.

Primrose jasmine, *Jasminum mesnyi*.

Hall's honeysuckle, *Lonicera japonica* 'Halliana'.

## Macfadyena unguis-cati


CAT'S CLAW

Dense green foliage shows off the bright yellow flowers that blanket the plant in spring. Although flowering is profuse, the bloom period is short-lived. Rapid, vigorous growth with clinging rootlets, it can spread to 30 feet or more, vertically or horizontally. Best on chainlink fence or brick—it has been known to pull stucco off walls. Native to Central and South America. Canopy coverage: 707 square feet.

## Mascagnia macroptera


YELLOW ORCHID VINE

*(Callaeum macropterum).* Twining vine with small, interesting, medium green leaves. Use on a trellis, chainlink fence or any upright support. Accepts some shade. Dense clusters of showy, yellow, orchid-shaped flowers appear in spring (if plants did not freeze the previous winter), and in fall. Remove frost-damaged leaves and stems in late winter or early spring. Moderately fast grower, reaching 15 feet in a year, but initially slow to establish. Native to Mexico. Canopy coverage: 177 square feet.

A similar plant is *Mascagnia lilacina,* purple orchid vine. It is about the same size and habit as yellow orchid vine, but is more cold hardy and flowers are purple.

## Parthenocissus tricuspidata 'Hacienda Creeper'


HACIENDA CREEPER

This cultivar of Boston ivy is semievergreen. A vigorous, clinging vine to 25 feet that will attach itself to masonry walls and stonework. Bright green, compound leaves turn to vivid shades of red and orange in fall. Locate where plants will receive some shade, preferably in the afternoon. Hybrid of parents native to China. Canopy coverage: 368 square feet.

Cat's claw, *Macfadyena unguis-cati.*

## Passiflora X alatocaerulea


PASSION FLOWER VINE

*(Passiflora pfordtii).* Twining evergreen vine rapidly grows to 30 feet in a single year. Foliage has a tropical look with three-part, bright green leaves. Masses of spectacular 4-inch flowers bloom in summer and are used to make perfume. Flowers are pink tinged white, with a crown of purple. Accepts some shade. Protect from wind. Hybrid of *Passiflora alata* of Peru and *P. caerulea* of Brazil. Canopy coverage: 707 square feet.

Yellow orchid vine, *Mascagnia macroptera.*

Hacienda creeper, *Parthenocissus tricuspidata* 'Hacienda Creeper'.

Passion flower vine, *Passiflora* X *alatocaerulea.*

### Podranea ricasoliana


PINK TRUMPET VINE

Twining vine with stems up to 20 feet long. Rich green leaves are divided into 9 to 11 leaflets. Clusters of pink flowers to 2 inches long bloom summer and fall. Stems damaged by frost recover rapidly in spring. Use on a trellis or chainlink fence, tying stems in place. Ideal plant for high-water, mini-oasis garden location. Native to southern Africa. Canopy coverage: 314 square feet.

### Rosa banksiae


LADY BANKS' ROSE, TOMBSTONE ROSE

Provide this popular evergreen to semi-deciduous vine with sturdy supports as it grows vigorously to 10 to 25 feet. Lady Banks' rose is suited to large-scale landscapes, where it can spread out or climb an arbor. This rose produces no thorns, so it is fine to use near pedestrian traffic areas or by pools. 'Lutea' blankets plants with double, pale yellow flowers in spring. 'Alba Plena' has double white flowers. Native to China. Canopy coverage: 368 square feet.

### Solanum laxum


POTATO VINE

*(Solanum jasminoides).* This semievergreen vine grows up to 30 feet long and about 10 feet wide. It blooms throughout the year in frost-free weather, but is most prolific in the spring. Provides nice light shade if given overhead supports for the twining vines. Small, white, star-shaped flowers have bright yellow centers and are borne in clusters. Cut back plants to renew growth. Native to Brazil. Canopy coverage: 79 square feet.

Pink trumpet vine, *Podranea ricasoliana.*

### Trachelospermum jasminoides


STAR JASMINE

*(Rhynchospermum jasminoides).* This vine to 30 feet has lustrous, deep green, leathery foliage, but is most admired for its masses of white, highly perfumed, star-shaped flowers, which bloom most heavily in spring. Versatile uses include espalier, pillar support vine or groundcover. Needs supports such as a trellis on which to climb. Best in east or north exposures. Native to China. Canopy coverage: 707 square feet.

Lady Banks' rose, *Rosa banksiae.*

Potato vine, *Solanum laxum.*

Star jasmine, *Trachelospermum jasminoides.*

## Vigna caracalla


SNAIL VINE

*(Phaseolus caracalla).* Snail vine is a vigorous, fast-growing, twining plant, reaching 30 feet in a year. With a foliage effect similar to the vegetable pole bean, it makes an excellent screen. Masses of slightly fragrant, showy, lavender flowers bloom throughout the year. Excellent trained on wire fences or on banks. Remains evergreen in mild winters. If frost kills top growth, cut back in early spring to rejuvenate. Can become woody. Occasionally mislabeled as *Phaseolus gigantea.* Native to tropical South America. Canopy coverage: 707 square feet.

## Vitis californica


CALIFORNIA WILD GRAPE

Climbing by tendrils, California wild grape can reach 30 feet in a summer. Grow it for the foliage, not the tiny, tart fruit. Leaves emerge gray and brighten to green, then turn red in fall before dropping. Vines regrow the following spring. 'Rogers Red' holds its gray-green leaf color all summer, then turns brilliant red and orange in fall. Native to California and Oregon. Canopy coverage: 707 square feet.

## Wisteria sinensis


CHINESE WISTERIA

This is the more commonly grown wisteria in the West. It has a twining and deciduous growth habit with medium green foliage. Needs support to grow such across the top of an arbor. It reaches up to 25 feet long. In spring, it puts on a show of purple or white flowers, depending on the cultivar. Native to China. Canopy coverage: 368 square feet.

Also look for *Wisteria floribunda,* Japanese wisteria. It is similar in appearance, reaching up to 25 feet.

California wild grape, *Vitis californica.*

Snail vine, *Vigna caracalla.*

Chinese wisteria, *Wisteria sinensis* 'Alba'.

Japanese wisteria, *Wisteria floribunda.*

# ORNAMENTAL GRASSES

Ornamental grasses are often overlooked elements in a lush, water-efficient landscape. This is a shame, because grasses add interest, texture and other unique features. They can soften the rigid outlines of cacti and succulents, and reinforce the arching, fountainlike theme offered by ocotillo or vase-shaped trees. Grasses also add color, depending on the species and season; some even have striking fall foliage. Others have persistent seedheads that rustle and sway in the wind like golden ornaments, adding the sense of sound and movement, like no other plant form. Several *Nolina* species have been included in this section. They are not actually grasses but are grasslike succulents, performing many of the same landscape functions as ornamental grasses. Consider these versatile low-water users as well. Photo above: *Festuca glauca*.

### Bouteloua curtipendula

SIDEOATS GRAMA

An upright, clumping grass with leaves that turn from blue-green during the growing season to tan in winter. Grows to 2 feet high and as wide. Flower stalks are pink to purple, blooming late spring and summer. Large seeds loved by birds develop on a single side of the stem. Native to North America. Canopy coverage: 3 square feet.

### Bouteloua gracilis

BLUE GRAMA

This grass produces distinctive seedheads that some describe as looking like a comb or eyelashes. Light green leaves dry to tan in winter. Seedheads appear in summer. A bunch-type grass, it grows to 2 feet high and 1 to 1-1/2 feet wide in low desert climates. It can be put to use as a drought-tolerant lawn cut 2 to 3 inches high. Native to North America. Canopy coverage: 2 square feet.

### Festuca glauca

BLUE FESCUE

*(Festuca cinerea, F. ovina glauca).* A blue-gray, ornamental grass with thin, blue-gray leaves, blue fescue grows in roundish tufts to 1 foot high, spreading to less than 1 foot wide. Plants create an interesting pattern in borders or in the foreground of taller perennials and shrubs. Seedheads rise above clumps in the fall, creating a shaggy effect. Will not tolerate wet, poorly drained soil. Native to Europe. Canopy coverage: 1 square foot.

Blue grama, *Bouteloua gracilis*.

Sideoats grama, *Bouteloua curtipendula*.

### Imperata cylindrica 'Rubra'

JAPANESE BLOOD GRASS

Forms upright clumps 1 to 2 feet high, spreading to 1 foot wide. Leaves emerge green in spring and redden as the weather warms. Best color occurs in a sunny exposure. This cultivar rarely flowers. Spreads by underground runners. Native to Japan. Canopy coverage: 1 square foot.

Blue fescue, *Festuca glauca*.

Japanese blood grass, *Imperata cylindrica* 'Rubra'.

### Muhlenbergia capillaris

PINK MUHLY

Plant this traffic stopper for its graceful, fluffy, purple to pink plumes. They put on a show of color in late summer and fall. Locate plants where the sun will backlight the flowerheads. Grows 3 to 4 feet high and as wide. This large size makes it excellent for large home landscapes and public areas such as parks and golf courses. 'Regal Mist'® is a popular cultivar. Native to Texas and northern Mexico. Canopy coverage: 13 square feet.

### Muhlenbergia dumosa

BAMBOO MUHLY

The common name of this muhly aptly describes its form: light green, bamboolike stems that are thin and airy. Its casual, clumping form has a fine, soft texture, reaching 4 to 5 feet high and as wide. Flowers are light green and not too showy. Accepts some shade; looks better with supplemental summer irrigation. Native to southern Arizona and northern Mexico. Canopy coverage: 20 square feet.

### Muhlenbergia emersleyi

BULL GRASS

Graceful, evergreen leaves clump to 4 feet high or more with an equal spread. Delicate, loose, reddish flower plumes reach a foot or two above the leaves in the fall. As they age they turn a cream color. Ideal when planted among boulders. Prefers afternoon shade in the Coachella Valley. Native to Texas. Canopy coverage: 13 square feet.

### Muhlenbergia lindheimeri

LINDHEIMER MUHLY

Presents a strong vertical form with slender leaves. Large clumps reach 5 feet high and as wide. Dense, fluffy, golden plumes evoke a dwarfish version of pampas grass. Accepts some shade. Native to Texas. An improved cultivar is 'Autumn Glow'™. Canopy coverage: 20 square feet.

Pink muhly, *Muhlenbergia capillaris*.

Deer grass, *Muhlenbergia rigens*.

### Muhlenbergia rigens

DEER GRASS

This workhorse ornamental grass becomes a graceful, fountain-shaped mound 3 to 4 feet high, spreading 3 to 4 feet wide. Lush, rich green foliage provides a softening element in the landscape. Slender, upright flower spikes 1 foot above the foliage in fall make a striking contrast to the curving, symmetrical mound. Accepts some shade. Native to southwestern U.S. Canopy coverage: 13 square feet.

### Nolina lindheimeriana

DEVIL'S SHOESTRING

Grows in a clumping form with long, narrow, medium green leaves. Leaves are leathery in texture with fine serrations along the margins. Not one of the larger *Nolina* species, it reaches 2 to 3 feet high and as wide.

Bamboo muhly, *Muhlenbergia dumosa*.

Bull grass, *Muhlenbergia emersleyi*.

Lindheimer muhly, *Muhlenbergia lindheimeri*.

Flower stalks to 3 feet high produce loosely patterned white to cream flowers in late spring and summer. Native to Texas. Canopy coverage: 7 square feet.

## Nolina matapensis


TREE BEAR GRASS

Its long, straplike leaves are glossy green, giving it a lush appearance. Edges are sharp, so take care when planting and maintaining. Eventually forms a trunk with mature plants reaching 12 to 15 feet high, spreading to 6 feet wide, but most plants are mounding to 6 feet high. Flowers are white plumes blooming on stalks well above the leaves in late spring and summer. Accepts heat and some shade. Native to Mexico. Canopy coverage: 28 square feet.

## Nolina microcarpa


BEAR GRASS

Narrow, grasslike leaves to 3 feet long form a fountain-shaped mound 3 to 6 feet high, spreading 5 to 8 feet wide. Leaf margins are covered with microscopic teeth. Stems rise 4 to 5 feet above the dense rosette clumps of small, creamy yellow flowers, which are striking in form, not in color. Plants thrive in gravelly, sandy, well-draining soil. Native to southwest U.S. Canopy coverage: 50 square feet.

## Panicum virgatum


SWITCH GRASS

This upright grass grows to a substantial size—4 to 5 feet high and as wide. Leaves are blue-green and grow vertically. Airy flower clusters rise above the leaves, increasing height of plant to 6 feet or more. These flower clusters emerge as pink, changing to white and then brown with the seasons. Leaves also change from green, to yellow to beige, adding interest to the winter garden. Several selections are available; check at your nursery. Native to North America. Canopy coverage: 20 square feet.

Tree bear grass, *Nolina matapensis*.

Bear grass, *Nolina microcarpa*.

## Pennisetum setaceum 'Rubrum'


RED FOUNTAIN GRASS

Forms a large, dense clump 5 feet high and 4 feet wide with medium-textured foliage and coppery seedheads. The species has become a rampant pest in parts of the U.S. Before seeds mature, cut off flowerheads, place them in a plastic bag and throw them away to prevent reseeding. However, 'Rubrum' only occasionally sets seeds. Native to tropical Africa. Canopy coverage: 13 square feet.

Devil's shoestring, *Nolina lindheimeriana*.

Switch grass, *Panicum virgatum*.

Red fountain grass, *Pennisetum setaceum* 'Rubrum'.

# CACTI

Cacti and succulents are very similar in their culture and use in the landscape. Here's a simple way to remember one difference: *All cacti are succulents, but not all succulents are cacti.* Members of either group are excellent choices for a low-water, low-maintenance landscape. In fact, their rating of "Low Water" is actually lower than other plants. As a general guide, water most cacti about every two weeks in summer.

From a design standpoint, most cacti are bold accents; others can be shrublike in form. Resist the temptation to get one of each and drop them here and there about the yard. A collection of unrelated shapes, sizes and colors can develop into an unappealing hodge-podge. Simulate what you see in nature, with groupings of cacti tucked between rocks or boulders, or partner with flowering perennials and shrubs. See The New Look of the Color Bed, page 132, for more ideas.

Photo above: *Opuntia basilaris.*

## Carnegiea gigantea


SAGUARO CACTUS

This columnar cactus is a well-known symbol of the Southwest. Extremely slow growing 50 to 60 feet high, it towers over the desert landscape. A saguaro may take 30 years to reach 10 feet high and be mature enough to flower. Large, white, bat-pollinated flowers appear wreathlike atop arms in May, followed by edible red fruit. Avoid winter irrigation, but supply monthly water in summer. Requires good soil drainage. Young plants can freeze at 30°F. In nature, they survive freezes and intense summer heat by growing under a "nurse tree" such as a palo verde or mesquite. Native to Sonoran Desert. Canopy coverage: 28 square feet.

## Cereus hildmannianus


HILDMANN'S CEREUS

A fast-growing, columnar, clumping cactus. Each column is up to 10 feet tall and 6 to 8 inches around. However, the entire plant can spread to 10 feet wide. During summer, large, showy white flowers open at night and fade by the next morning. A large, luscious, watermelon-flavored fruit follows the flowers, if they have been pollinated. Accepts some shade. Native to eastern South America. Canopy coverage: 79 square feet.

Hildmann's cereus, *Cereus hildmannianus*.

Saguaro cactus, *Carnegiea gigantea*.

## Cylindropuntia acanthocarpa


BUCKHORN CHOLLA

*(Opuntia acanthocarpa)*. This multiple-branching cactus can take on a shrublike appearance with its Medusa-like branches. It grows to 4 feet high and 5 feet wide, with yellowish spines contrasting with its green branches. Flowers are red or yellow and bloom in spring. Native to Sonoran and Mojave deserts. Canopy coverage: 20 square feet.

Buckhorn cholla, *Cylindropuntia acanthocarpa*.

### Echinocactus grusonii


GOLDEN BARREL CACTUS

One of the best cactus for a bold accent in the landscape due to its symmetrical, globular shape and brilliant, golden spines that light up in the sun. Grows slowly to 3 feet high or more, but remains a manageable size in most gardens for many years. Small yellow flowers appear in spring on the fuzzy crown of mature plants. Plant in sandy, well-drained soil. Water infrequently, perhaps once a month, slightly more often during summer. Native to Chihuahuan Desert. Canopy coverage: 7 square feet.

Golden barrel cactus, *Echinocactus grusonii.*

### Echinocereus engelmannii


ENGELMANN'S HEDGEHOG

A short, clumping cactus that stops traffic when its large, brilliant, magenta flowers appear in May. A single plant may reach 12 inches high and 8 inches across, but clumps can eventually spread several feet wide. Long, gray, downward-pointing spines show bands of red after a rain. Accepts some shade. Native to Sonoran Desert. Canopy coverage: 28 square feet.

### Ferocactus cylindraceus


COMPASS BARREL

*(Ferocactus acanthodes).* At home in natural desert landscapes, this stout, barrel-shaped cactus is a subtle accent in a water-efficient garden. Slow growing to 4 feet high by 1-1/2 feet wide. Plants tend to lean southward with time, giving them their common name. Spines are straight and reddish yellow. Yellow to orange flowers appear in May, followed by fruits with many, tiny, edible seeds inside. Natives would roast and eat the seeds. Avoid overwatering. Native to Sonoran and Mohave deserts. Canopy coverage: 3 square feet.

### Ferocactus wislizenii


FISH-HOOK BARREL CACTUS

This cactus looks much like the compass barrel, except the spines are curved in a fish hook shape. And, with time (several decades), it can eventually reach 10 feet high. Spring flowers are yellow to orange, followed by yellow, tart, edible fruit filled with thousands of tiny black seeds. Don't overwater or plants may rot and die. Plant in sandy, well-drained soil. Native from Arizona into west Texas and Mexico. Canopy coverage: 3 square feet.

Engelmann's hedgehog, *Echinocereus engelmannii.*

Fish-hook barrel cactus, *Ferocactus wislizenii.*

Compass barrel, *Ferocactus cylindraceus.*

# Opuntia species
## Prickly Pear

There are well over 200 varieties of prickly pear. Some have blue-gray pads, some are bright green and others are tinged with violet. Cup-shaped flowers appear in May and bloom in shades of yellow, orange or magenta. All cactus family spines grow out of a cluster called an *aureole*. Some species lack long spines but have *glochids* instead. These are like porcupine quills, in that they are barbed to go in, not out. If you are unfortunate enough to come in contact with these tiny spines, removing them from your skin is difficult. One method seems to work: Coat the area with white glue, let it dry, then peel the spines away.

### Opuntia basilaris


BEAVERTAIL PRICKLY PEAR

Typically blue-gray or deep green pads with aureoles of glochids. (See above.) Brilliant magenta flowers appear in May. Grows to 1 foot high and spreads to 4 feet wide, replicating the space and utility of a small shrub in the landscape. Native to southwest U.S. Canopy coverage: 13 square feet.

### Opuntia bigelovii


TEDDYBEAR CHOLLA

Don't be fooled by the common name teddybear cholla—this cacti is far from cuddly. On the contrary, it is hands-down one of the best choices as a security or barrier plant. Plants grow 3 to 6 feet high and 3 feet wide. Older spines remain on the trunk, turning dark brown or black. They contrast with new top growth that is bright, light yellow, and deadly to the touch. The segmented stems break off easily, attaching themselves to passersby or pets, so avoid planting near walkways. Very little water required; plants typically exist on meager annual rainfall of 4 inches or more. Native to U.S. Southwest and northern New Mexico. Canopy coverage: 7 square feet.

Beavertail prickly pear, *Opuntia basilaris*.

### Opuntia engelmannii


ENGELMANN'S PRICKLY PEAR

Classic green pads with widely spaced, gray-white thorns. Pads are crowned in spring with yellow flowers followed by magenta fruit. Desert tortoises adore the sweet fruit, and people use the fruit to make jelly and candy. Reaches 4 feet high and spreads to 8 feet wide. Takes the form and space of a medium-sized shrub in the landscape. Native to southwest U.S. Canopy coverage: 50 square feet.

Teddybear cholla, *Opuntia bigelovii*.

Engelmann's prickly pear, *Opuntia engelmannii*.

### Opuntia ficus-indica

INDIAN FIG

This tall, treelike prickly pear reaches up to 15 feet high and as wide. It is a horticultural selection discovered and cultivated in tropical and subtropical America. The pads are thornless. Cup-shaped yellow to orange flowers are followed by fruit that slowly turn from green to yellow to a purplish red. It is uncertain where this plant originated. Canopy coverage: 177 square feet.

### Opuntia lindheimeri var. linguiformis

COW'S TONGUE PRICKLY PEAR

Looking at the shape of the pads, it's easy to see how this cactus got its name. The long, elongated pads begin with a broad base, tapering to a narrow point. Like other *Opuntia* species, requires very little water and can exist on meager natural rainfall. Flowers are yellow, blooming in spring. Plants reach to 6 feet high (usually less) and as wide. Makes a distinctive accent or barrier plant. Native to Texas. Canopy coverage: 28 square feet.

### Opuntia robusta

GIANT PRICKLY PEAR

You will marvel at the size of the rounded pads of giant prickly pear—they are larger than dinner plates. Long thorns protect the plant, making it a worthwhile barrier. With time, takes on a massive, shrublike form to 10 feet high and as wide. The yellow flowers bloom in spring followed by the typical, red, prickly pear fruit. Native to Mexico. Canopy coverage: 79 square feet.

Purple prickly pear, *Opuntia santa-rita.*

Indian fig, *Opuntia ficus-indica.*

### Opuntia santa-rita

PURPLE PRICKLY PEAR

The distinctive purplish hues of the aptly named purple prickly pear is one of its appealing features. The extent of cold temperatures or dry conditions will influence

Cow's tongue prickly pear, *Opuntia lindheimeri* var. *linguiformis.*

Giant prickly pear, *Opuntia robusta.*

the purplish coloring. Plants grow slowly to 4 feet high and spread to 5 feet wide. Plants are highly drought tolerant. The striking yellow flowers bloom in spring, contrasting nicely with the pads. Native to Sonoran and Mojave deserts. Canopy coverage: 20 square feet.

### Pachycereus marginatus


MEXICAN FENCEPOST

This is a fast-growing, handsome, dark green, columnar cactus. It can reach 10 feet high and branching from the base can spread to 6 feet wide, although each column is about 6 inches in diameter. The 4 to 6 ribs of each column are decorated with small white spines. Pink flowers appear in spring. Use as a bold, dramatic accent in the ground or in a container. Native to southern Mexico. Canopy coverage: 28 square feet.

### Stenocereus thurberi


ORGAN PIPE CACTUS

A slow-growing columnar cactus with narrow ribs and aureoles of small reddish brown spines. Individual columns are golden green, about 8 inches in diameter, and grow to 10 feet high. Clumps can spread to 10 feet wide with time. Pale pink flowers open at night in late spring. Native to Sonoran Desert. Canopy coverage: 79 square feet.

Organ pipe cactus, *Stenocereus thurberi*.

Mexican fencepost, *Pachycereus marginatus*.

### Trichocereus huascha


ARGENTINE HEDGEHOG

Recently reclassified as *Echinopsis huascha*. A clumping hedgehog cactus with golden spines covering an olive green body. They glow beautifully when backlit by the sun and can be quite dramatic. Clumps reach to 2 feet high and 3 feet wide. Huge glowing red to orange flowers appear in spring, each one lasting only a single day. Accepts some shade. Native to Argentina. Canopy coverage: 7 square feet.

Argentine hedgehog, *Trichocereus huascha*.

# SUCCULENTS

Succulents could be the poster plants for water-thrifty. Their adaptations are to be admired, whether it is how they store water in their stems and leaves for the dry times, or reducing their leaf surface to slow moisture loss.

Succulents are top-of-the-list accent plants—use them as exclamation points in the landscape. Some are attractive clustered together in groups or even as a mass planting; others are more effective planted as single specimens. The "big three" group of Agaves, Aloes and Yuccas, all succulents, offer an extremely wide range of intriguing plants to include in your yard. Take some time to study their forms and mature sizes. Locate them carefully in your landscape, away from where people or pets walk and congregate; many succulents are armed with sharp spines or thorns. Place them in groups and partner with related plants, as well as among rocks and boulders, emulating a natural desert scene. Photo above: *Agave potatorum.*

# Agave species
## AGAVE

Agaves are also known as century plants. Although most live far less than 100 years, they can endure for decades, slowly storing energy and increasing in size. They eventually spend this energy on one massive flowering event. Depending on the species, they produce a single large flower stalk up to 15 to 30 feet high, offering flowers for pollination by hummingbirds, other birds and bats. After flowering, the plant dies.

Most agaves have sharp spines on the tips of their leaves. Many also have teeth along the leaf margins. This can make them beautiful to behold but dangerous to be near. Locate them well away from walkways or outdoor living areas, and allow for their mature size. Unlike a shrub or groundcover, trimming or pruning an agave to suit a small space becomes an unsolvable disaster. You must learn to live with it, or remove it.

### Agave americana


CENTURY PLANT

Grayish blue-green leaf blades have spines on tips and margins. With time, grows to 10 feet high and spreads to 15 feet wide—too large for most of today's gardens. Average life span is 20 years. A number of slightly smaller, variegated varieties of *Agave americana* are available; a few are described here. Native to Mexico but naturalized in mild-winter climates worldwide. Canopy coverage: 177 square feet.

A similar agave is *Agave americana marginata,* variegated century plant. Grayish blue-green leaf blades feature a stripe of yellow down the *margins* of both sides of every leaf. Plant reaches up to 10 feet high and 12 feet wide. Because of its large size, locate it carefully. Accepts some shade. Canopy coverage: 113 square feet.

Century plant, *Agave americana*. Inset: *Agave americana marginata*.

Blue glow agave, *Agave* 'Blue Glow'.

Also look for *Agave americana mediopicta*. Grayish, blue-green leaf blades have a stripe of yellow down the *middle* of every leaf. It reaches 4 feet high and 4 feet wide. Accepts some shade. Canopy coverage: 13 square feet.

### Agave 'Blue Glow'


BLUE GLOW AGAVE

Sleek, narrow, blue-green leaves with red and yellow margins are armed with needle-sharp points. Locate away from pedestrian traffic but close enough to admire the color and symmetrical, rosette form. This hybrid grows to about 1-1/2 feet high and 2 to 3 feet wide. Provide with afternoon shade in low desert climates. Leaves "glow" when backlit by the sun, thus its name. Canopy coverage: 7 square feet.

### Agave bovicornuta


COW'S HORN AGAVE

An agave of a slightly different color, the wide leaves are rich, light to dark green, with serrated toothed margins armed with reddish brown or yellow spines. Grows to 4 feet high and to 5 feet wide with time. Locate where plants will receive afternoon shade or beneath a canopy tree with filtered sunlight. Native to Mexico. Canopy coverage: 20 square feet.

Cow's horn agave, *Agave bovicornuta*.

## Agave colorata

MESCAL CENIZA

Broad, blue-gray leaf blades are edged with intricate, dark brown teeth that leave delicate embossed patterns on the leaf they were pressed against in the bud. Solitary plants form an angular yet compact rosette 4 feet high and 4 feet wide. Slow to moderate growth rate. Native to Sonora, Mexico. Canopy coverage: 13 square feet.

## Agave desmettiana

SMOOTH AGAVE

This agave prefers partial to even full shade in low desert climates. The long, light green leaves curve upward, with sharp tips that have smooth margins. Plants grow at a fast rate into a graceful, open rosette to 3 feet high and as wide. When plants bloom, the stalk reaches several feet tall with a candelabra of pale yellow flowers. Offsets continue plantings after primary plant flowers and then dies. 'Variegata' features yellow bands along the leaf margins. Canopy coverage: 7 square feet.

## Agave filifera

THREADLEAF AGAVE

*(Agave filamentosa)*. Forms clumps in rosettes, growing at a moderate rate to 2 feet high and as wide. A primary attraction are the fine threads or filaments that curl around the margins of the leaf blades. Stiff spines at the tips of leaves require careful handling when planting or maintaining. Provide afternoon shade in hot desert climates. Native to Mexico. Canopy coverage: 3 square feet.

Mescal ceniza, *Agave colorata*.

Havard agave, *Agave havardiana*.

## Agave geminiflora

TWIN-FLOWERED AGAVE

Narrow, medium green leaves have sharp tips but toothless edges. Occasionally, the leaves are graced with fine white marginal fibers. Solitary plants reach 3 feet high and 3 feet wide with a moderate to rapid growth rate. Tolerates a range of exposures. In full or reflected sun, the rosettes are tight and compact. Plants in full shade have a more open and relaxed growth habit. Well-suited as a container plant. Native to west central Mexico. Canopy coverage: 7 square feet.

## Agave havardiana

HAVARD AGAVE

This agave grows to 2 to 3 feet high and 3 feet wide, typically in a tight rosette. Leaves are long, to 2 feet, blue-gray to dull green, with toothed margins armed with sharp terminal spines. Provide with some shade in low desert climates. Flowering stalk produces yellow-green flowers. Native to west Texas and northern New Mexico. Canopy coverage: 7 square feet.

Smooth agave, *Agave desmettiana*.

Threadleaf agave, *Agave filifera*.

Twin-flowered agave, *Agave geminiflora*.

## Agave murpheyi


MURPHEY'S AGAVE

Medium wide leaves are bluish to yellow green with spines on the tip and many fine teeth along the edges. At a slow to moderate growth rate, plants reach 3 feet high and 3 feet wide. Pups form readily from the base, but also can be found on the flowering stalk. Accepts some shade. These were once cultivated by native indians in Arizona. Native to Arizona and Sonora, Mexico. Canopy coverage: 7 square feet.

## Agave parryi


PARRY'S AGAVE

Broad, gray-green leaves are edged with brown teeth that leave embossed patterns on the leaf they were pressed against in the bud. Forming compact, nearly round rosettes, individual plants reach 3 feet high and as wide. Pups can readily spread to become large colonies. Native from central Arizona into New Mexico. Canopy coverage: 7 square feet.

Also consider the similar *Agave potatorum,* to 2 feet high and 2-1/2 feet wide. See photo page 112.

## Agave victoria-reginae


QUEEN VICTORIA AGAVE

A compact, symmetrical little agave that takes on quite a regal appearance. The solitary plants reach 1 to 1-1/2 feet high and as wide. It is excellent for smaller spaces, in containers and in filtered sun such as beneath canopy trees. The short, thick leaves have distinctive white markings and a single spine at each tip. Native to Mexico. Canopy coverage: 3 square feet.

Murphey's agave, *Agave murpheyi.*

## Agave vilmoriniana


OCTOPUS AGAVE

Light green, fleshy and unarmed, the leaves of the octopus agave elongate and curve back, arching with age, until the plant does take on the appearance of a large, green octopus. The solitary plants reach 4 feet high and spread to 6 feet wide with a slow to moderate growth rate. They flower when they are around a decade old. They do not pup from the base, but can easily be grown from pups called *bulbils* that appear on the flowering stalk. Native to west-central Mexico. Canopy coverage: 28 square feet.

## Agave weberi


WEBER'S AGAVE

One of the largest agaves, it makes a dramatic accent with broad, blue-green leaves that form a tighter rosette than *Agave americana.* Leaf edges have many fine teeth. Individual plants reach 5 feet high and 5 feet wide at a slow to moderate growth rate. Needs occasional watering to look its best. Accepts some shade. Occasionally produces pups. Native to east central Mexico. Canopy coverage: 20 square feet.

Parry's agave, *Agave parryi.*

Queen victoria agave, *Agave victoria-reginae.*

Weber's agave, *Agave weberi.*

# Aloe species
## ALOE

Aloes are highly variable in form, size, color and texture. Some species make dramatic accents, such as *Aloe ferox,* while others, including *Aloe vera* and *Aloe variegata,* look their best massed in large beds. Many do well in containers. Once they are mature, they flower every year with long stalks of flowers pollinated by hummingbirds. Not all aloes are medicinal such as *Aloe vera*—some are used to make poison darts! Aloe mite can be a problem with some species. All aloes are native to Africa.

### Aloe arborescens


TREE ALOE

Thick, fleshy leaves are usually gray-green although they can vary with subspecies; some are sea green to lime green. Leaves are 2 inches wide and 2 feet long with regular gray teeth along the margins. Growth is upright and bases become woody. In their native South Africa, ancient plants reach 3 to 14 feet high, topped in winter with tall spikes of red flowers. Canopy coverage: 28 square feet.

Cape aloe, *Aloe ferox.*

Tree aloe, *Aloe arborescens.*

Partridge breast aloe, *Aloe variegata.*

### Aloe X 'Blue Elf'


BLUE ELF ALOE

This hybrid aloe remains on the small side, reaching 1-1/2 feet high and 1-1/2 to 2 feet wide. Plants form clumps of small rosettes, each one producing orange-red flowers on tall spikes 1-1/2 to 2 feet high. Leaves are blue-green with toothed margins. Performs well in low desert regions, tolerating the desert heat. Canopy coverage: 3 square feet.

### Aloe ferox


CAPE ALOE

A slow-growing, solitary aloe that eventually becomes treelike to 12 feet high and 5 feet wide. Thick, wide, bluish green leaves are edged with russet-colored teeth. Hummingbirds love the flaming orange-red flowers that appear clustered on a tall stalk from late winter into spring. Locate where plants will receive afternoon shade and water once a month in summer for best appearance. Native to the South African Cape. Canopy coverage: 20 square feet.

### Aloe variegata


PARTRIDGE BREAST ALOE

This small aloe likes to live in the protected understory environment such as beneath canopy trees or shrubs. It reaches 1 foot high and as wide with gray-green, triangular leaves decorated with white markings. Plants slowly form clumping colonies that produce spikes of coral-pink flowers in spring and again in fall, attracting hummingbirds. Provide protection from the afternoon sun by planting in an eastern exposure. Excellent in a rock garden or mixed in with spring wildflowers. Native to South Africa. Canopy coverage: 1 square foot.

### Aloe vera

ALOE VERA, TRUE ALOE

*(Aloe barbadensis)*. Long, slender, gray-green leaves unmarked by any spots combined with yellow flowers help you identify plants as true *Aloe vera*. Grows to 3 feet high and 3 feet wide but be aware it spreads even wider due to its offsets. Flowers bloom late winter and into spring, appearing on spikes up to 2 feet high above the plant. Accepts full sun to part shade; provide supplemental water in summer if plants are located in full sun. Native to Mesopotamia, and traded throughout Africa, Asia and Europe. Canopy coverage: 7 square feet.

Aloe vera, *Aloe vera*.

### Asclepias linearis

THREADLEAF MILKWEED

A bright green, fine-textured plant that can be used as an accent or backdrop in a water-efficient landscape. Soft, fine, threadlike leaves are held rigidly out from the multiple stems that form a shrublike clump to 3 feet high and as wide. Clusters of small white flowers appear on branch ends from spring into fall, and are a favorite of both queen and monarch butterflies. Native to southern Arizona. Canopy coverage: 7 square feet.

### Asclepias subulata

DESERT MILKWEED

Grows to 4 feet high and 3 feet wide with slender, gray-green stems. Interesting pale yellow, flat-topped flowers bloom in clusters from spring into fall. Seedpods to 3 inches long split and send out silvery seed fluffs. Great accent around rock-studded drainage swales or courtyards. Good soil drainage required. Attracts queen and monarch butterflies, especially if they are planted in a mass. Self sows. Native to the Sonoran Desert. Canopy coverage: 7 square feet.

### Beaucarnea recurvata

PONY TAIL PALM

An unusual focal point plant, pony tail palm has an other-worldly appearance with its bulbous base, tall trunk and explosion of bright green, arching, strap-shaped leaves on top. Attractive, cream to white plumes of flowers bloom in late spring. Can grow 12 to 15 feet high and 8 to 10 feet wide—even larger with time. Consider growing it in a large container. Native to Mexico. Canopy coverage: 50 square feet.

### Bulbine frutescens

BULBINE

Long stalks of delicate yellow or orange flowers appear in spring, forming clumps to 1-1/2 feet high and 2 feet wide. Leaves of orange-flowering forms are more gray-green and are more tolerant of full sun. Leaves of yellow-flowering forms are brighter green and do better with some shade. Both grow best in well-drained soil. Can be grown in containers. Native to South Africa. Canopy coverage: 3 square feet.

Desert milkweed, *Asclepias subulata*.
Inset: *Asclepias linearis*.

Bulbine, *Bulbine frutescens*.

Pony tail palm, *Beaucarnea recurvata*.

## Dasylirion longissimum

GRASS TREE

*(Dasylirion quadrangulatum).* Dramatic, tropical-looking accent plant that eventually can reach over 10 feet high, topped with a whorl of long, slender, dark green, grasslike leaves. Although it needs only 8 to 10 inches of rainfall per year, it will tolerate more water, so it can be combined with other, lush, tropical plants. Also accepts shade to part shade exposures. Native to Mexico. Canopy coverage: 20 square feet.

Grass tree, *Dasylirion longissimum.*

## Dasylirion wheeleri

DESERT SPOON, SOTOL

An outstanding accent that grows slowly, eventually developing a trunk. Mature size is 4 to 6 feet high, spreading to 5 feet wide. Narrow, gray-green leaves are sharply toothed along the edges. It is highly attractive in a desert setting. Once mature, flower spikes to 12 feet high appear in late fall, but age at which plants actually begin to bloom is unpredictable. Native to southern Arizona. Canopy coverage: 20 square feet.

*Dasylirion acrotriche,* green desert spoon, is almost identical to desert spoon. Its leaves are bright green rather than gray-green. Select this one if you seek a subtropical landscape effect.

## Euphorbia milii

CROWN OF THORNS

Grows as a small shrub from 1 to 4 feet high and 1-1/2 feet wide. Color produced is not from flowers but from *bracts*, which are modified leaves. Many selections are available in a range of colors, including red, pink, orange and yellow. Unusual branching habit features sparse leaves seen typically at ends of branches, which are armed with thorns to 1 inch long. Like all euphorbias, it produces sap that is poisonous and can irritate the skin. Native to Madacascar. Canopy coverage: 3 square feet.

## Euphorbia rigida

GOPHER PLANT

*(Euphorbia biglandulosa).* Unique, spring-flowering shrubby perennial with blue-gray, textured vertical and spreading branches that grow 2 feet high by 4 feet wide. Flowers on tips of branches are unforgettable, brilliant chrome yellow. Most effective in a sunny spot. Mass in small areas in well-drained soil or plant in containers. After flowers complete bloom cycle, cut back branches to encourage new growth. Like all euphorbias, it produces sap that is poisonous and can irritate the skin. Native to the Mediterranean. Canopy coverage: 13 square feet.

Desert spoon, *Dasylirion wheeleri.*
*Inset: Dasylirion acrotriche.*

Crown of thorns, *Euphorbia milii.*

Gopher plant, *Euphorbia rigida.*

## Fouquieria splendens

OCOTILLO

Ocotillo is one of the most distinctive plants of the desert Southwest, and helps provide the Coachella Valley with a sense of place. A few to many, unbranched thorny canes, 10 to 15 feet long, arch up, out and away from the plant's base, creating a distinct vase shape. Small, bright green leaves cover the canes during periods of rain and humidity. Leaves drop during dry conditions as plants become dormant. Spikes of flame orange flowers that attract hummingbirds bloom at branch tips during spring. An excellent accent and focal point, especially when backlit by the sun. Prefers rocky limestone soils. Canes can be cut and used to create living fences. Note that nursery plants grown in containers establish better than bare-root plants. Native to southwestern U.S. Canopy coverage: 28 square feet.

## Hesperaloe parviflora

RED YUCCA

Despite its name, this succulent is not a yucca, but in the agave family. It is a workhorse accent plant, flowering tirelessly. Long, slender, swordlike leaves are edged with loose, curling white threads. Plants form clumps to 3 feet high and spread slowly to 5 feet or more. Tall spikes of coral-pink flowers bloom from late spring into late summer. The bell-shaped flowers are loved by hummingbirds. 'Brakelight' has brighter colored flowers. A variety with pale yellow flowers is also available. Native to Texas. Canopy coverage: 20 square feet.

*Hesperaloe funifera*, giant hesperaloe, is similar but larger, reaching to 6 feet high and as wide. Leaves are upright, thicker and swordlike. Wide-spreading flower stalks are not as showy as red yucca. They reach to 10 feet high topped with greenish white blooms late spring to summer. Native to the Chihuahuan Desert.

Red yucca, *Hesperaloe parviflora*. Inset: *Hesperaloe funifera*.

Ocotillo, *Fouquieria splendens*.

Madagascar palm, *Pachypodium lamerei*.

## Hesperoyucca whipplei

OUR LORD'S CANDLE

*(Yucca whipplei)*. Slender, bluish, gray-green leaves are 1-1/2 feet long and 3/4 inch wide. They radiate from the base to form an attractive rosette 2 feet high and 3 feet across. Like agaves, this yucca flowers one time and then dies, but generally a few pups (small plants) form around its base to ensure its long-term survival. Accepts some shade. Avoid planting near walkways. Native to California, Arizona and Baja California. Canopy coverage: 7 square feet.

## Pachypodium lamerei

MADAGASCAR PALM

This distinctive member of the oleander family has gray bark and a swollen trunk where it stores water. The crown of large leaves on top and paired spines along the stem give it its unique appearance. Slow growing from 10 to 15 feet high, the diameter remains about 2 feet wide. Protect from cold when temperatures drop near freezing. If grown in a container, don't forget to move to a warmer location when frost threatens. Accepts some shade. Native to southern Africa. Canopy coverage: 3 square feet.

### Pedilanthus macrocarpus

SLIPPER FLOWER

A striking succulent that forms a clump of mostly leafless, upright, silvery green stems about the diameter of your index finger. Stems reach 2 to 3 feet high with the clump spreading slowly to 2 feet wide. The striking red "slippers" contain several tiny flowers, plus nectar sought by hummingbirds. Flowers appear in late spring and occasionally summer into fall. Makes a fine container plant. Accepts some shade. Like most succulents, plant in soil with good drainage. Native to Baja California. Canopy coverage: 3 square feet.

Slipper flower, *Pedilanthus macrocarpus*.

### Portulacaria afra

ELEPHANT'S FOOD

This succulent is well adapted to the Coachella Valley. It's an excellent container plant with an interesting, flowing growth habit that appears to flow waterfall-like over the edge of a container or across the ground. It is often confused with jade plant, *Crassula argentea,* which it resembles. Elephant's food grows more rapidly, has more open growth, with limber, tapering branches. Stems are brownish, covered with 1/2-inch, glossy green, succulent leaves. Best with afternoon shade, but too much shade can cause plants to become straggly. Can suffer damage when exposed to intense direct sun. Native to South Africa. Canopy coverage: 13 square feet.

Elephant's food, *Portulacaria afra*.

## Yucca species

## YUCCA

Yuccas are generally more cold tolerant than agaves. Indeed, some survive in the wild as far north as North Dakota. Yuccas may have spines on leaf tips, but never along the edges, as agaves often do. Yuccas can be solitary or form clumps from the base of plants.

Once mature, yuccas bloom every year with tall stalks of creamy white flowers. Leave the dried stalks on the plant for the favorite nesting place of native bumblebees, or use in dried arrangements. All yuccas are native to the Americas.

### Yucca aloifolia

SPANISH BAYONET

Stiff, sharp-tipped, 2-inch leaves are bright green to blue green, and grow 1-1/2 to 2-1/2 feet long. This is a clumping yucca—individual plants reach to 10 feet high and 4 feet across. Clumps may spread to cover 20 feet. An ideal accent for large spaces, but best located well away from pedestrians due to their sharp spines.

Variegated (striped) cultivars are available. Native to southwest U.S. Canopy coverage: 13 square feet.

Spanish bayonet, *Yucca aloifolia*.

### Yucca baccata

BANANA YUCCA

*(Yucca arizonica)*. Stiff, erect, bluish green leaves are 1 inch wide and 2 feet long. Single plants grow to 3 feet high and to 5 feet across. Forms stemless clumps with 2 to 6 rosettes. White to cream bell-shaped flowers en masse bloom on stalks spring and into summer. They are followed by fleshy, green to purple, bananalike fruits 4 to 6 inches long that are edible. Prefers well-drained soil. Native to southwest U.S. Canopy coverage: 20 square feet.

### Yucca elata

SOAPTREE YUCCA

Refined, deep green leaves are almost grasslike, just 1/2-inch wide but growing to 4 feet long. Threadlike fibers on the margins add interest. As leaves grow in dense clusters at the tops of the trunk, the dead, golden to brown leaves cling tightly to the trunk, shading the plant. It is slow growing and rarely branches, reaching 6 to 20 feet high and 8 feet wide. Roots contain saponins that work like soap. Native to Arizona and New Mexico. Canopy coverage: 50 square feet.

### Yucca faxoniana

FAXON YUCCA, EVE'S NEEDLE

The size and form of this yucca makes it a dominant focal point in the landscape. Reaching up to 15 feet high and 10 feet wide, it is an imposing figure, due in part to its large, ascending, 2-1/2-foot-long leaves, tipped with dagger-sharp points. This is not a plant to locate next to outdoor living spaces or walkways. White flowers bloom in clusters in spring to early summer on stalks to 4 feet high. Native to Texas and New Mexico. Canopy coverage: 79 square feet.

Banana yucca, *Yucca baccata*.

Soaptree yucca, *Yucca elata*.

Faxon yucca, *Yucca faxoniana*.

### Yucca filamentosa


ADAM'S NEEDLE

This yucca does not have a trunk or primary stem—it forms a rosette of narrow, light green, flexible leaves to 2 feet or more long. Plants reach 2 to 3 feet high and 3 to 4 feet wide. Long, loose filaments adorn the leaf edges. Creamy white flowers bloom late spring to summer on 10-foot stalks. Plants die after flowering but plantings live on via offsets. 'Color Guard' features a yellow stripe that runs down the center of each leaf blade. Native to southeast U.S. Canopy coverage: 13 square feet.

### Yucca glauca


NARROW-LEAF YUCCA, SOAPWEED

Grows 3 to 4 feet high and as wide in a tight rosette. Plants sometimes form in clumps, other times remain a single specimen. The pointed, gray-green leaves are stiff and narrow, just 1 inch wide, and grow to 2 feet long. The white, lilylike flowers bloom on stalks to 3 feet high in late spring to early summer. Native to Texas north to midwestern U.S. Canopy coverage: 13 square feet.

### Yucca gloriosa


SPANISH DAGGER

Rosettes of bluish green, stiffly upright, fleshy leaves grow to 2 feet long and 2 inches wide. This is a clumping yucca that grows at a moderate rate to 10 feet high and up to 8 feet wide. Plant base becomes woody with age. Leave the tidy dead leaves in place—they help keep the plant cool. Native to southeastern U.S. from North Carolina into Florida. Canopy coverage: 50 square feet.

Adam's needle, *Yucca filamentosa.*

Pale-leaf yucca, *Yucca pallida.*

### Yucca pallida


PALE-LEAF YUCCA

Pale blue-green leaves are flexible, measuring 1 foot long and just 1 inch wide. This unusual yucca has finely serrated leaf margins that can be marked with light yellow to white. A clumping yucca, individual plants reach 1 to 2 feet high and spread from 1 to 3 feet wide. Provided regular moisture, clumps can get large, with up to 30 rosettes. Native to north central Texas. Canopy coverage: 7 square feet.

Narrow-leaf yucca, *Yucca glauca.*

Spanish dagger, *Yucca gloriosa.*

### Yucca rigida


BLUE YUCCA

Powder blue leaves are stiff and armed with sharp tips, reaching to 2 feet long and 2 inches wide. The solitary plants reach 12 feet high and spread to 5 feet wide. Older leaves dry and press against the trunk, which helps the plant conserve moisture. For this reason, it's best to leave this thatch in place. Striking coloration and bold form make the blue yucca an outstanding accent plant. Native to northern central highlands of Mexico. Canopy coverage: 20 square feet.

### Yucca rostrata


BEAKED YUCCA

Young plants first appear as a symmetrical rosette then gradually develop a sturdy single trunk. A thatch of dry leaves eventually forms along its trunk. As with blue yucca, leave this thatch in place. Mature plants reach to 12 feet high or more, spreading to 10 feet or more, sometimes with multiple trunks. White flowers are profuse, blooming on 2-foot stalks above the gray-green leaves in spring. Native to southern Texas and Mexico. Canopy coverage: 79 square feet.

Beaked yucca, *Yucca rostrata*.

Blue yucca, *Yucca rigida*.

### Yucca schidigera


MOJAVE YUCCA

*(Yucca mohavensis)*. Typically grows in a rosette form 3 to 4 feet high, spreading to 3 feet wide, but can become much larger with time. Usually has a short trunk that supports stiff, dull green leaves with sharp terminal spines. Spikes of white flowers tinged with purple bloom in spring. Accepts some shade. Native to Mojave and Sonoran deserts. Canopy coverage: 7 square feet.

Mojave yucca, *Yucca schidigera*.

# PERENNIALS

By definition, perennials are plants that live for more than one year, although many are known to thrive for several years. They are primarily grown for their flowers, but some do double duty as groundcovers, or even shrubs. Most are easy to grow in containers—just provide them with a well-draining potting mix. For a new landscape or a major renovation they are excellent choices for the color and interest they add in a short amount of time.

Gardeners living in the Coachella Valley have a huge selection of perennials to chose from—both cultivated varieties as well as native perennial wildflowers. Selections of each are described here.

Photo above: *Oenothera caespitosa.*


Lily-of-the-Nile, *Agapanthus orientalis.*


Woolly yarrow, *Achillea tomentosa.*


Asparagus fern, *Asparagus densiflorus* 'Myers'.


Anise hyssop, *Agastache foeniculum.*


Desert marigold, *Baileya multiradiata.*


Columbine, *Aquilegia* hybrids.

| Botanical Name<br>Common Name | How to Grow<br>Sun, Water, Temp. | Description<br>Mature Size Flowers Bloom Season |
|---|---|---|
| *Achillea tomentosa*<br>**WOOLLY YARROW** | 10° | Grows 1 to 2 feet high with gray-green leaves. Large delicate flowers on long stems may be salmon, yellow, lavender or white. Locate where plants will receive afternoon shade in a rich, organic soil. Cut back winter-dormant plants for regrowth the following spring. Canopy coverage: 3 square feet. |
| *Agapanthus praecox orientalis*<br>**LILY-OF-THE-NILE** | 15° | Produces large clusters of blue, ball-shaped flowers on 2-foot stems surrounded by dark green, straplike, evergreen leaves. Fleshy roots store moisture. Effective in containers. Locate where plants will receive afternoon shade; they burn in summer sun in low desert. Canopy coverage: 3 square feet. |
| *Agastache foeniculum*<br>**ANISE HYSSOP** | 20° | This shrublike perennial grows to 3 feet and as wide but is short-lived. It is known for its licorice-scented leaves. Purplish flowers on spikes attracts bees and butterflies, blooming from midsummer and into fall. Requires well-drained soil. Several other *Agastache* species and cultivars are also available in a range of flower colors. Canopy coverage: 7 square feet. |
| *Aquilegia* hybrids<br>**COLUMBINE** | 0° | Grows 1 to 3 feet high, with gray-green leaves. Large intricate flowers may be yellow, salmon, lavender or white. Mass plantings provide the best results. Prefers rich, organic soil where plants will receive afternoon shade. Cut back winter-dormant plants for fresh, new growth the following spring. Canopy coverage: 3 square feet. |
| *Asparagus densiflorus*<br>**ASPARAGUS FERN** | 24° | 'Sprengeri' has small leaves on arching branches, forming a rich, fluffy, bright green mound. Grows 2 to 3 feet high and as wide. Use as groundcover, border, filler or perhaps the best use is in containers. Accepts exposure ranging from shade to full sun. 'Myers' ('Myersii') is similar but more refined with dense, clean, foxtail stems. Canopy coverage: 7 square feet. |
| *Baileya multiradiata*<br>**DESERT MARIGOLD** ☆ | 10° | Grows 1 to 1-1/2 feet high, with bright yellow, daisylike flowers that bloom almost continuously from spring to fall on tall stems. Woolly gray leaves form a clump to 6 inches high. Cut back in winter to stimulate new growth and flowers in spring. Ideal perennial for a natural garden or include in a wildflower planting. Reseeds readily. Seeds attract birds. Canopy coverage: 1 square foot. |

Chocolate flower, *Berlandiera lyrata*.

Lance-leaf coreopsis, *Coreopsis lanceolata*.

Tasman flax lily, *Dianella tasmanica*.

Dusty miller, *Centaurea cineraria*.

Kaffir lily, *Clivia miniata*.

'Zagreb' coreopsis, *Coreopsis verticillata*.

| Botanical Name<br>Common Name | How to Grow<br>Sun, Water, Temp. | Description<br>Mature Size Flowers Bloom Season |
|---|---|---|
| *Berlandiera lyrata*<br>**CHOCOLATE FLOWER** ☆ | 10° | Grows to 1-1/2 feet high with 2-foot spread. Sprays of flowers in shades of yellow bloom spring to early summer and produce a fragrance similar to chocolate. Flowerheads expand in morning then droop in afternoon. Leaves are green above, whitish underneath—combine with other gray-leaved plants. Canopy coverage: 3 square feet. |
| *Centaurea cineraria*<br>**DUSTY MILLER** | 10° | Compact growth to 2 feet high and as wide. Velvety white leaves have broad, roundish lobes. Solitary flowerheads are purple or yellow. Plant in full sun. Good soil drainage important. Be aware there are several different plants known by the name dusty miller. Canopy coverage: 3 square feet. |
| *Clivia miniata*<br>**KAFFIR LILY** | 25° | A fine choice for some extravagance in a shady location. Orange flowers bloom in clusters on stout stems to 2 feet high in early spring. 'Aurea' has pale yellow flowers. Leaves of Belgian hybrids are wider, dark green. For best flowers, let them grow undisturbed, forming large clumps. Great container specimen. Canopy coverage: 3 square feet. |
| *Coreopsis lanceolata*<br>**LANCE-LEAF COREOPSIS** | 10° | Plants grow to 2 feet high with yellow daisylike flowers on long stems that bloom spring into early summer. 'Early Sunrise' grows to 1-1/2 feet high with double golden yellow flowers. Coreopsis are great border plants and cut flowers. Plant in full sun in regular garden soil. Canopy coverage: 3 square feet. |
| *Coreopsis verticillata*<br>**'ZAGREB' COREOPSIS** | 10° | Grows to 1 foot high and about 2 feet wide. Golden yellow flowers bloom on tall stems, contrasting nicely with bright green leaves. Flowering season is long—late spring to fall. Birds, including goldfinches, are attracted to the seeds. Canopy coverage: 3 square feet. |
| *Dianella revoluta*<br>'Baby Bliss'<br>**FLAX LILY** | 25° | A grasslike evergreen native to Australia, with distinctive blue-green leaves. It grows to a compact 1 to 1-1/2 feet high and as wide. Pale blue-violet flowers bloom spring and late summer, followed by ornamental blue berries. Accepts some shade. Drought tolerant once it is established. Canopy coverage: 3 square feet. |
| *Dianella tasmanica*<br>**TASMAN FLAX LILY** | 25° | A grasslike perennial with strap-shaped green leaves. Grows in a clumping form to almost 3 feet high, spreading by rhizomes to 3 feet or more wide. Plants can become invasive if located close to well-irrigated planting beds. Small but striking blue flowers bloom in spring, followed by blue berries, much like its cousin, flax lily. 'Variegata' is often a preferred choice with leaves that feature wide white stripes along its margins, adding brightness to shady corners. Canopy coverage: 7 square feet. |

Peacock flower, *Dietes bicolor.*

Green gold, *Euryops pectinatus* 'Viridis'.

California fuschia, *Epilobium canum.*

Purple coneflower, *Echinacea purpurea.*

Blanket flower, *Gaillardia* X *grandiflora.*

Gaura, *Gaura lindheimeri.*

| Botanical Name<br>Common Name | How to Grow<br>Sun, Water, Temp. | Description<br>Mature Size Flowers Bloom Season |
|---|---|---|
| *Dietes bicolor*<br>**PEACOCK FLOWER** | 25° | Plants grow from rhizomes to 2-1/2 feet high with stiff, upright leaves. Lemon yellow flowers with maroon spots bloom for several months during the warm season. Requires moderate water use, but more moisture equals more flowers. Canopy coverage: 3 square feet. |
| *Dietes grandiflora*<br>**BUTTERFLY IRIS**<br>*(Dietes vegeta, Moraea iridoides)* | 25° | Similar to *Dietes bicolor*. Evergreen perennial from rhizomes to 2 feet high with stiff upright leaves. Small, white, irislike flowers bloom spring to fall. Accepts full sun to partial shade. Canopy coverage: 3 square feet. |
| *Echinacea purpurea*<br>**PURPLE CONEFLOWER** | 15° | Purple cone-shaped flowers are long lasting and its casual growth make it a favorite in natural gardens. Grows 2 to 4 feet high and 2-1/2 feet wide. Accepts most soils but does need full sun. Grows easily from seed and competes well with grasses. Native to prairies in midwestern U.S. Canopy coverage: 3 square feet. |
| *Epilobium canum*<br>**CALIFORNIA FUSCHIA**<br>*(Zauschneria californica)* | 10° | Upright stems 8 to 12 inches high form a mat composed of small gray to green leaves. Bright orange-red or white tubular flowers are borne in clusters at ends of stems early summer through winter, which are loved by hummingbirds. Can become invasive if regular moisture is available. Canopy coverage: 3 square feet. |
| *Euryops pectinatus*<br>'Viridis'<br>**GREEN GOLD** | 27° | Forgiving evergreen perennial that is often used a small shrub. 'Viridis' is an improved selection. Grows 3 to 4 feet high and 3 feet wide with fine-textured, deep green leaves. Yellow daisylike flowers to 2 inches across bloom profusely fall into early winter. Good container plant. Tolerates a wide range of climates. Canopy coverage: 7 square feet. |
| *Gaillardia* X *grandiflora*<br>**BLANKET FLOWER** | 15° | This plant is a hybrid of *Gaillardia aristata* and *G. pulchella*. It flowers continuously from spring to frost. Striking red and yellow flowers are set off by glossy green leaves. Plants range in size from less than 1 foot to 4 feet high and 1-1/2 feet wide. Many easy-to-grow varieties are available. Canopy coverage: 3 square feet. |
| *Gaura lindheimeri*<br>**GAURA** | 10° | Grows 1 foot high, spreading up to 2 feet wide. Frilly white to pink flowers bloom on tall spikes summer into fall. Cut plants back in winter to encourage new, healthy growth. May be sold in nurseries as butterfly flower. Canopy coverage: 3 square feet. |

Daylily, *Hemerocallis* hybrids.

Blackfoot daisy, *Melampodium leucanthum.*

Baby's breath, *Gypsophila paniculata.*

Gazania, *Gazania splendens.*

Spanish lavender, *Lavandula stoechas.*

White evening primrose, *Oenothera caespitosa.*

| Botanical Name<br>Common Name | How to Grow<br>Sun, Water, Temp. | Description<br>Mature Size Flowers Bloom Season |
|---|---|---|
| *Gazania* hybrids<br>**GAZANIA** | 15° | Grows 1 foot high and 1 foot wide with gray-green leaves. Large delicate flowers on long stems may be salmon, orange, yellow, lavender or white. Locate plants where they will receive afternoon shade. Plant in a rich, organic soil. Cut back winter-dormant plants for regrowth the following spring. Canopy coverage: 1 square foot. |
| *Gypsophila paniculata*<br>**BABY'S BREATH** | 0° | 'Bristol Fairy' is an improved selection, growing to 3 feet high and as wide. Large loose clusters of tiny, double white flowers bloom profusely through summer on bluish green stems. Heat tolerant. Canopy coverage: 7 square feet. |
| *Hemerocallis* hybrids<br>**DAYLILY** | 0° | Both evergreen and deciduous hybrids are available. Plants form a clump of slender arching leaves. Flowers in clusters bloom at the ends of tall stems midspring to early fall. They resemble lilies and come in many colors, including yellow, orange, red and many pastel shades. Canopy coverage: 7 square feet. |
| *Lavandula stoechas*<br>**SPANISH LAVENDER** | 15° | This is the most heat-tolerant lavender, growing 3 to 4 feet high and 3 feet wide. Mounding plants have blue-green foliage, complementing lavender-blue flower spikes that bloom in late spring and summer. Flowers and foliage are fragrant. Plants accept some shade, and prefer it in the afternoon. Canopy coverage: 7 square feet. |
| *Melampodium leucanthum*<br>**BLACKFOOT DAISY** ☆ | 15° | A spreading, mounding, groundcover perennial that grows 1 foot high and up to 2 feet wide. White daisylike flowers with yellow centers bloom throughout the year. Excellent when allowed to spread among rocks and boulders. Does best in well-drained soil. Canopy coverage: 3 square feet. |
| *Nierembergia linariifolia*<br>**DWARF CUP FLOWER** | 30° | Low-growing, reaching 8 to 10 inches high. Flowers are 1 inch long, bell-shaped, in rich blue to violet or white. Plant in fall or winter for flowers in summer. Best with afternoon shade or in partial shade, and planted in well-prepared soil. Remove spent blooms (deadhead), which encourages more flowers. Canopy coverage: 1 square foot. |
| *Oenothera caespitosa*<br>**WHITE EVENING PRIMROSE** ☆ | 5° | Evergreen with large, gray-green leaves and masses of large, white 4-inch flowers. Blooms on and off throughout the year, but is most prolific in spring. Plants form rounded clumps 1 to 1-1/2 feet high, spreading 3 feet wide. May die out in summer if overwatered. Reseeds readily. Canopy coverage: 7 square feet. |

Rock penstemon, *Penstemon baccharifolius.*

Superb penstemon, *Penstemon superbus.*

Firecracker penstemon, *Penstemon eatonii.*

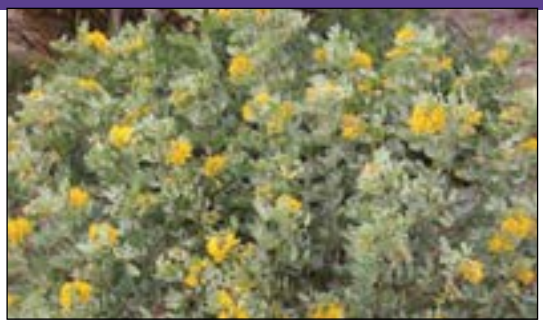
Parry's penstemon, *Penstemon parryi.*

Paperflower, *Psilostrophe cooperi.*

| Botanical Name<br>Common Name | How to Grow<br>Sun, Water, Temp. | Description<br>Mature Size Flowers Bloom Season |
|---|---|---|
| *Penstemon baccharifolius*<br>**ROCK PENSTEMON** ☆ | 5° | Growth is different than most penstemons in that it is more shrublike to 2 feet high and to 3 feet wide. 'Del Rio' is an improved selection, with cherry colored flowers blooming spring through fall. Loved by hummingbirds. Provide good soil drainage to prevent root diseases. Canopy coverage: 7 square feet. |
| *Penstemon eatonii*<br>**FIRECRACKER PENSTEMON** ☆ | 0° | This plant is among the first to bloom in early spring. Tubular scarlet flowers appear on 3- to 4-foot stems above basal growth to 2 feet high and as wide. Plant in full sun—a shady location can cause plants to sprawl. Best in well-drained soils. Reseeds readily. Attracts hummingbirds. Canopy coverage: 3 square feet. |
| *Penstemon parryi*<br>**PARRY'S PENSTEMON** ☆ | 18° | Tall, strongly vertical, 3- to 5-foot stems show off flowers in shades of pink. Widely adapted to desert regions. Accepts full sun but better with filtered or afternoon shade in low desert. Plant in soil with good drainage. After flowers bloom and set seed, cut back to top of leaf rosette. Reseeds readily. Canopy coverage: 3 square feet. |
| *Penstemon pseudospectabilis*<br>**CANYON PENSTEMON** ☆ | 0° | Grows 1-1/2 to 2 feet high and to 3 feet wide in typical penstemon rosette form. In spring, tubular flowers in shades of purple appear above the basal growth on stems to 2 feet high. Plant in full sun—a shady location can cause plants to sprawl. Best in well-drained soils. Reseeds readily. Attracts hummingbirds. Canopy coverage: 7 square feet. |
| *Penstemon superbus*<br>**SUPERB PENSTEMON** ☆ | 15° | One of the largest penstemons, growing to 2 feet high and up to 3 feet wide. Brilliant, coral, tubular flowers bloom on tall stems in late spring. Best in well-drained soils. Accepts some shade. Reseeds readily. Attracts hummingbirds. Canopy coverage: 7 square feet. |
| *Pentas lanceolata*<br>**STAR FLOWER** ☆ | 32° | A perennial that is often grown as a summer-blooming annual. A lush, subtropical plant to 3 feet high and as wide, it blooms almost year-round in frost-free climates. Flowers are tiny stars in rounded clusters to 4 inches across, in shades of pink, red, lilac and white. If plants persist through winter, cut back severely just prior to spring growth to renew. Canopy coverage: 7 square feet. |
| *Psilostrophe cooperi*<br>**PAPERFLOWER** ☆ | 10° | Plants grow 1 foot high, spreading to 3 feet wide. Evergreen foliage is gray-green. Yellow, daisylike flowers about 1 inch in diameter cover plants for long periods spring through fall. Will accept partial shade. Don't overwater; combines well with cacti. Canopy coverage: 7 square feet. |

Black-eyed Susan, *Rudbeckia hirta.*

Mealy cup sage, *Salvia farinacea.*



Desert senna, *Senna covesii.*

Texas paperflower, *Psilostrophe tagetina.*

Mexican hat, *Ratibida columnifera.*

| Botanical Name<br>Common Name | How to Grow<br>Sun, Water, Temp. | Description<br>Mature Size Flowers Bloom Season |
|---|---|---|
| *Psilostrophe tagetina*<br>**TEXAS PAPERFLOWER** | 20° | Shrubby evergreen that covers itself with bright yellow flowers from spring through summer and into fall. Growth is mounding to 1-1/2 feet high, spreading to 3 feet wide. After flowers dry and turn papery, they maintain their yellow color. Locate in full sun to partial shade. Canopy coverage: 7 square feet. |
| *Ratibida columnifera*<br>**MEXICAN HAT** | 10° | Wildflower perennial, growing to 2 feet high and as wide. Plant in masses for best effect and to enjoy the interesting yellow or maroon flowers. They bloom at the tips of long stems, the petals draping downward, surrounding dark cones in the flower's center. Blooms spring to fall. Canopy coverage: 3 square feet. |
| *Rudbeckia hirta*<br>**BLACK-EYED SUSAN** | -10° | Plants grow to 3 feet or more high and as wide. Large, showy, yellow-orange flowers are excellent for cutting and bloom all summer and into fall. Plant in full sun in almost any soil, spring to late fall. Cut back after bloom period. Can be grown as an annual with a fall sowing. Canopy coverage: 3 square feet. |
| *Salvia farinacea*<br>**MEALY CUP SAGE** | -10° | Grows 1-1/2 to 2 feet high with an equal spread. Violet-blue flower spikes bloom for quite a long period spring through summer. Effective planted in masses. Best in full sun. Native to New Mexico and Texas. Attracts hummingbirds. Many other perennial salvias are available; check local nurseries for selections. Canopy coverage: 3 square feet. |
| *Salvia* 'Mystic Spires Blue'<br>**COMPACT INDIGO SPIRES SAGE** | 10° | This is a compact version of 'Indigo Spires', which grows much larger. This *Salvia* grows to 2 to 3 feet high with an equal width. Dark blue flowers in upright spires bloom summer into fall, set off by its blue-green leaves. Attractive to wildlife. Canopy coverage: 7 square feet. |
| *Salvia* X *superba*<br>**BLUE QUEEN SAGE** | 10° | Compact plant 1 to 2 feet high and as wide. Produces deep blue flower spikes from early summer until frost. Attractive when planted in masses. Best in full sun location with regular summer irrigation. Deadhead spent flowers frequently to increase flower production. Canopy coverage: 3 square feet. |
| *Senna covesii*<br>**DESERT SENNA** | 0° | Shrubby wildflower perennial that is a prime candidate for revegetation of disturbed areas. Coarse appearance, but produces typical yellow *Senna* flowers in summer. Providing additional irrigations will extend the bloom season into fall. Grows 2 to 3 feet high and as wide but can get much larger. Leaves are gray-green. Easy to grow from seed. Canopy coverage: 7 square feet. |


Licorice marigold, *Tagetes lucida.*


Angelita daisy, *Tetraneuris acaulis.*


Golden dyssodia, *Thymophylla pentachaeta* var. *pentachaeta.*


Desert zinna, *Zinnia acerosa.*


Globe mallow, *Sphaeralcea ambigua.*


Society garlic, *Tulbaghia violacea.*


Prairie zinnia, *Zinnia grandiflora.*

| Botanical Name<br>Common Name | How to Grow<br>Sun, Water, Temp. | Description<br>Mature Size Flowers Bloom Season |
|---|---|---|
| *Sphaeralcea ambigua*<br>**GLOBE MALLOW** ☆ | 5° | Shrubby wildflower perennial that grows to 3 feet high and as wide. Coarse-textured leaves are gray-green. Small, cup-shaped flowers bloom in spring. They come in many colors; the species is orange. Be careful while handling plants—they can irritate eyes and skin of some individuals. Self sows. Canopy coverage: 7 square feet. |
| *Tagetes lucida*<br>**LICORICE MARIGOLD** | 20° | A fall bloomer with flowers that are similar to mountain marigold, *Tagetes lemmonii*, page 87, but growth habit is more compact at 3 to 4 feet high and as wide. Leaves emit a scent of anise. Midsummer pruning controls growth and helps produce stronger stems to support flowers. May go dormant in winter. Canopy coverage: 13 square feet. |
| *Tetraneuris acaulis*<br>**ANGELITA DAISY** ☆<br>*(Hymenoxys acaulis)* | 10° | Grows 1 foot high and as wide in a rounded, clumping form. Profuse numbers of golden yellow, daisylike flowers on stems above medium green leaves bloom throughout the year. Tuck into small spaces among boulders, or combine with cacti and succulents. Best with afternoon shade. Canopy coverage: 1 square foot. |
| *Thymophylla pentachaeta* var. *pentachaeta*<br>**GOLDEN DYSSODIA** ☆<br>*(Dyssodia pentachaeta)* | 10° | Small-scale perennial, growing to just 4 to 8 inches high and 1 foot wide. Medium green, needlelike leaves are the perfect backdrop to its profuse, bright yellow, daisylike flowers that bloom spring into fall. Not fussy about soil. Combines well with cacti and succulents, or tucked between rocks and boulders. Self sows. Canopy coverage: 1 square foot. |
| *Tulbaghia violacea*<br>**SOCIETY GARLIC** | 0° | Rosy lavender flowers bloom in large clusters in spring and summer; their long-term beauty help make up for the plant's garlic scent. Flowers bloom on tall stems well above leaves, which develops into large clumps about 1 foot across. Grow in well-drained soil. Cut back in early spring to renew growth. Canopy coverage: 1 square foot. |
| *Zephyranthes candida*<br>**RAIN LILY** ☆ | 20° | Grows 1 foot high and as wide in a clumping, spreading form with thin, upright leaves. White star-shaped flowers typically bloom in masses following summer rains. Also consider *Zephranthes grandiflora*, a similar species with pink flowers. Canopy coverage: 1 square foot. |
| *Zinnia acerosa*<br>**DESERT ZINNIA** | R 10° | Grows less than 1 foot high, spreading to 1 foot wide. White daisylike flowers are small but bloom for a long period—spring into fall. Excellent mounding plant to spread in a natural manner amongst rocks and boulders. Accepts tough conditions, including low water. Canopy coverage: 1 square foot. |
| *Zinnia grandiflora*<br>**PRAIRIE ZINNIA** | 0° | Grows 1 foot high and as wide. Spreads to fill in nooks among rocks and boulders. Flowers are yellow to orange, similar in appearance to desert zinnia, with a bloom period from summer to fall. Flowers attract butterflies. Accepts some shade. Canopy coverage: 1 square foot. |

# ANNUALS

## The New Look of the Color Bed

The ways in which we garden—the plants we choose to grow, how we combine them and how we irrigate them—are constantly changing. This includes the color garden, which, in the Coachella Valley, has traditionally meant growing annuals—plants that complete their life cycle in one year. Many factors have recently come into play: change in preferences, an increase in demands on water resources and a *less is more* approach. It's easy to see that the look of color landscapes in the valley is noticeably different than a short decade ago.

For many years the conventional approach to the color bed, no matter the size and scale of the planting area, involved planting flat after flat of bedding plant annuals. This process was repeated in both spring and fall, usually involving extensive time, labor and expense to accomplish. Yes, the beds were lush and colorful, but were far from being efficient users of time and water.

A new look to the color bed is taking hold in the Coachella Valley. It certainly involves color, but the plants that are chosen are not exclusively temporary annuals. They include all types of plants: water-efficient perennials, ornamental grasses, shrubs, cacti and succulents. Rather than blanketing an expansive bed with rows of bedding plant annuals, these plants are artfully combined with non-plants: native boulders, rock and decomposed granite, creating a more natural look. We live in a desert, with an annual rainfall averaging about 4 inches a year. This new approach to adding color to our environment speaks to that.

Gardeners are reaching for accent plants, in particular. Agaves, aloes and yuccas, among others, are taking center stage. They are ideal plants to evoke the sense of place of the Sonoran Desert, and work so well with the "non-plants" mentioned above.

This new look applies to a grand, sweeping entrance to a neighborhood development, and equally well to a small home lot. Annuals are welcome, but rather than trying to overpower a scene with masses of annual plants, we use them judiciously. This actually increases their impact. Small jewels of planting beds, annuals grouped in containers, annuals placed close-up by outdoor living areas—each provides that splash of color we all enjoy, but at a greatly reduced cost in time, money, and especially *water*.

Because our planting beds are smaller, we must be a little more choosy with our selections. The vibrant colors of flowering annuals, lined up in containers, pots and packs at the nursery, will tempt us all. Each variety of these bedding plants looks appealing and we want to take all of them home to add to our gardens. But it's wise to have a design in mind, and prepare the soil for planting beds before purchasing plants.

Planting annuals at the right time can be the difference between success or failure. Ideal periods to plant winter- and spring-blooming annuals are when night air temperatures range between 40°F to 60°F, and daytime air temperatures are 60°F to 80°F. Daytime soil temperatures should be about 75°F. These conditions generally occur from mid-October through November.

Soil-borne organisms have plagued new plantings of petunias and periwinkle when planted in the same location, year after year. Prevent by removing leaf debris from planting beds, discard dead or dying plants and keep plants growing vigorously at all times. Just like a farmer rotates his crops, rotate plantings—don't always grow the same kind of annual in the same bed.

## Wild about Wildflowers

The charts on pages 136 and 137 feature photos and descriptions of wildflowers adapted to grow in the Coachella Valley. Including wildflowers in your landscape takes a little planning, but is worth the effort. In order of preference, fall, winter and early spring are the best periods for sowing seed of spring-blooming species. Plant summer-flowering varieties in spring. Be aware these will require more moisture compared to seeding in fall. Plant in almost any location that receives at least six hours of sun each day. Wildflowers native to the desert are, by their nature, equipped to cope with our climate and soil conditions. However, like other plants, even tough desert natives require regular moisture to germinate seeds and establish seedlings.

Wildflower mixes adapted to the low desert are available; individual species also work well. It depends on the effect you want. If you create your own combination, select wildflowers that bloom at the same time. Consider planting them separately (don't mix seeds together) to create distinct, eye-catching bands and swaths of color.

Seed mixtures typically contain six or more species to ensure a long season and a variety of color. A 1-ounce seed packet will cover approximately 500 square feet.

Prepare the planting area by removing weeds prior to cultivation. Rake lightly to create a seedbed. Soak the soil slowly to moisten 8 to 12 inches deep. Broadcast seeds with a hand-held fertilizer spreader or by hand. Most wildflower seeds are very small. Mixing with fine dry sand helps provide more even distribution, and you can see where seeds are being applied. Don't plant seeds too deep. Most wildflowers do best with just 1/8-inch coverage of soil, but read the seed package to be sure.

After seeding, rake the soil lightly in a crisscross pattern to cover seeds. Water lightly with a fine mist attachment on the hose to avoid creating gullies and runoff. Water seeded areas regularly (usually every day) until seedlings appear. After seeds sprout, water a couple of times each week, depending on moisture content of soil. Pull weeds as they appear.

Germination periods vary considerably for different wildflowers, and vary according to soil and air temperatures. Some may sprout in two weeks, others take four to six weeks. Adequate deep moisture is essential.

Once plants complete their flowering cycle and go to seed, cut them back to about 6 inches high. With some wildflowers, you can collect seeds for next year's planting. Some seeds will have been eaten by birds or otherwise lost. To ensure another season of color, reseed about half as much as the original planting in fall. Perennial species will usually continue into the following year.

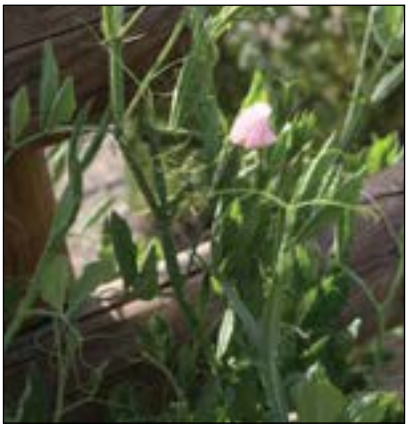

Calendula, *Calendula officinalis.*


Periwinkle, *Catharanthus roseus.*


Chrysanthemum, *Chrysanthemum* X *morifolium.*


Cosmos, *Cosmos bipinnatus.*


Snapdragon, *Antirrhinum majus.*


Sweet pea, *Lathyrus odoratus.*


Dianthus, *Dianthus* species.


Geranium, *Geranium* species.

| Botanical Name<br>Common Name | How to Grow<br>Sun, Water, Plants/Seeds | Description<br>Mature Size Flowers Bloom Season |
|---|---|---|
| *Antirrhinum majus*<br>**SNAPDRAGON** | Plants Fall | Tall, 1- to 1-1/2-foot "tetra" forms do best when staked early in their life to support stems. Dwarf types 6 to 18 inches high are ideal for massing and in borders. Colorful cut flowers. Plant mid-October to February. Plants bloom well into spring with regular water and light, monthly applications of fertilizer. |
| *Calendula officinalis*<br>**CALENDULA** | Plants Spring | Flower colors range from bright yellow to deep orange, with best appearance in late winter and early spring. Growth is vigorous to 18 inches high. Long-lasting cut flowers. Plants tend to sprawl. Space 15 to 18 inches apart. |
| *Catharanthus roseus*<br>**PERIWINKLE, VINCA**<br>*(Vinca rosea)* | Plants Spring | Profuse flowers from spring into summer, and often into fall. Accepts the desert heat. Many flower colors, including white, red, pink and magenta. Most selections grow 12 to 15 inches high but smaller forms are available. Plant in late spring. Feed with diluted liquid fertilizer monthly. |
| *Chrysanthemum* X *morifolium*<br>**CHRYSANTHEMUM** | Plants Fall | This is the garden-variety chrysanthemum, also known as florist's chrysanthemum. Typically grown as an annual but plants may survive for years. They are available in a wide range of flower colors, growing 1 to 1-1/2 feet high. Accepts some shade. |
| *Cosmos bipinnatus*<br>**COSMOS** | Seeds Fall | Open and airy color plant, with soft fernlike leaves and daisylike flowers in vibrant shades of pink, red or white. Plant form is informal to 3 to 5 feet high so locate in the back of a natural border. Easy to grow from seed, or available as bedding plants in containers. Plant in moderately rich soil in full sun location in fall or early spring. |
| *Dianthus* species<br>**DIANTHUS** | Plants Fall | A perennial, but treat as an annual in the Coachella Valley. Colors range from white, pink, red, purple and shades between. Flowers have a delightful, spicy fragrance; enjoy in bouquets. Best in enriched, well-drained soil. Stake early to support tall flower stems. Accepts full sun to partial shade. |
| *Geranium* species<br>**GERANIUM** ☆ | Plants Spring | Geraniums are treated as annuals in low-elevation desert regions and are ideal container color plants. Accepts full sun or partial shade but requires well-drained soil. Enjoy the spring flowers then move containers into shade as the warm season comes on in late April and May. |
| *Lathyrus odoratus*<br>**SWEET PEA** | Plants Fall | Sweet peas are available in a wide range of colors, blooming late winter through spring. Dwarf types excel in flower borders or in planters. If you start with seeds, soak them in water for several hours before planting. Plant in well-prepared soil, and provide supports for plants to climb. |


Lobelia, *Lobelia erinus*.


Zinnia, *Zinnia elegans*.


Pansy, *Viola* X *wittrockiana*.


Petunia, *Petunia* hybrids.


Sweet alyssum, *Lobularia maritima*.


Marigold, *Tagetes erecta*.


Tropical sage, *Salvia coccinea*.

| Botanical Name<br>Common Name | How to Grow<br>Sun, Water, Plants/Seeds | Description<br>Mature Size Flowers Bloom Season |
|---|---|---|
| *Lobelia erinus*<br>**LOBELIA** ☆ | Seeds<br>Fall | Popular and dependable border plant or cover for bulbs, grown for late winter and spring bloom. Flowers are usually light blue to violet with contrasting throats in white or yellow. Also start as bedding plants. Grows 6 to 8 inches high. Plant in rich, improved soil. Can reseed with good growing conditions. |
| *Lobularia maritima*<br>**SWEET ALYSSUM** ☆ | Plants<br>Fall | An easy-care annual that is an excellent companion to bright-colored annuals or perennials. Grows 6 to 8 inches high in white, rose or purple. Easy to grow from seed or set out plants from packs fall to early spring. Locate in sun to partial shade. |
| *Petunia* hybrids<br>**PETUNIA** | Seeds<br>Fall | Petunias are the most colorful of all annuals in desert gardens, and are available in a wide range of forms and flower colors. Prefers sun but accepts partial shade. Mix pellet-type fertilizer into soil when planting. Check soil moisture often to avoid overwatering, which can lead to disease problems. |
| *Salvia coccinea*<br>**TROPICAL SAGE** | Plants<br>Fall | This is a short-lived perennial that is most often grown as an annual. Prolific flowers appear in summer, available in a range of bright colors and bicolors. They bloom on upright plants 2 to 3 feet high and 2 feet wide. Reseeds easily. Plants may overwinter; cut back severely just prior to new spring growth for a bonus year. |
| *Tagetes erecta*<br>**MARIGOLD** | Plants<br>Spring | Valuable summer color plants. Select from a wide range of flower forms in yellows and oranges. Dwarf, 8- to 12-inch types are ideal in borders; taller 18-inch varieties look best behind low border shrubs. Keep plants growing continuously with regular water and fertilizer. |
| *Verbena* hybrids<br>**VERBENA** ☆ | Plants<br>Fall | Colorful annual border plants, growing 8 to 12 inches high. Available in a range of flower colors, including white, red, pink, blue and purple. After flowering, trim spent blooms for regrowth and more flowers. Plant in fall to enjoy late winter and spring flowers. |
| *Viola* X *wittrockiana*<br>**PANSY** | Plants<br>Fall | Reliable annual for winter and spring color. Many selections are available in a wide range of flower colors. Grows 6 to 8 inches high. Best in a warm microclimate. Enrich soil with blood meal before planting and feed monthly with diluted liquid fertilizer. Cut back plants lightly in March to April to renew growth. |
| *Zinnia elegans*<br>**ZINNIA** | Plants<br>Spring | One of the best annuals for summer color—zinnias thrive in heat. Flowers come in a range of bright hues. Many are large—up to 5 inches across. Dwarf types grow as low as 6 inches; taller types can be 3 feet high. 'Profusion' series grow 1-1/2 to 2 feet high. Flood irrigate or use drip irrigation; applying water from sprinklers can cause problems with mildew. |


Sand verbena, *Abronia vilosa.*


California poppy, *Eschscholzia californica.*


Maximilian sunflower, *Helianthus maximilianii.*


Bachelor's button, *Centaurea cyanus.*


Indian blanket, *Gaillardia pulchella.*


Tidy tips, *Layia platyglossa.*


Toadflax, *Linaria maroccana.*

| Botanical Name<br>Common Name | How to Grow<br>Sun, Water, Plants/Seeds | Description<br>Mature Size Flowers Bloom Season |
|---|---|---|
| *Abronia vilosa*<br>**SAND VERBENA** | Seeds<br>Fall | This plant looks much like a verbena, but is a different genus. With fall and early spring rains, it blankets natural areas in the valley with a sea of color, particularly on sand dunes. Rose to purple flowers cover plants that grow to a few inches high, spreading wide with long trailing stems. Leaves and stems are hairy and sticky. |
| *Centaurea cyanus*<br>**BACHELOR'S BUTTON** | Seeds<br>Fall | Grows to 2 feet high and almost as wide. Blooms from late spring to fall. The foliage is gray-green with blue, rose, pink or white flowers at the end of the stems. Accepts full sun to partial shade. Reseeds readily. Grows in almost any soil. |
| *Clarkia amoena*<br>**FAREWELL-TO-SPRING** | Seeds<br>Fall | This annual wildflower grows to 2 feet high with slender stems that support cup-shaped flowers in shades of pink, lavender or red. Several flowers often bloom on a single flowering stalk. Easy to grow from seed, but does not do well in humid climates when temperatures climb above 80˚F. |
| *Eschscholzia californica*<br>**CALIFORNIA POPPY** ☆ | Seeds<br>Fall | California poppy is the state flower of California. Orange to yellow, cup-shaped flowers bloom on 12- to 18-inch stems from spring into early summer. Plants reseed readily. Sow seed where you want plants to grow. Does not like soil that is continuously moist or overly rich. |
| *Gaillardia pulchella*<br>**INDIAN BLANKET** ☆ | Seeds<br>Spring | Often used in western region wildflower seed mixes for its aggressive and consistent growth. Plants grow to 1-1/2 to 2 feet high. Long slender stems are topped with 2-inch, patterned, red, yellow and gold flowers. Easy to grow from seed. Plant in soil with good drainage. Bloom period lasts from midsummer to frost. |
| *Helianthus maximilianii*<br>**MAXIMILIAN SUNFLOWER** | Seeds<br>Spring | A perennial grown as an annual in the Coachella Valley. Tall flower stalks to 6 feet high or more are topped with familiar sunflower flowers in fall. Place at back of border due to plant height. Accepts some shade and most soil conditions. Birds love the seeds. |
| *Layia platyglossa*<br>**TIDY TIPS** | Seeds<br>Fall | Wildflower annual with yellow, daisylike flowers tipped with white. They are 1 to 2 inches across and showy, blooming on plants to 1 foot high. Flowering begins in early spring and can last for several months. Grows best in well-drained soil in full sun. Accepts some shade. |
| *Linaria maroccana*<br>**TOADFLAX** | Seeds<br>Fall | An annual wildflower growing 1 to 2 feet high. Flowers come in mixed colors, from red, pink, gold, violet and purple that look like tiny snapdragons. Blooms spring to summer. Grows easily from seed. Prefers light shade. |

Blue flax, *Linum perenne* subspecies *lewisii.*

Arroyo lupine, *Lupinus succulentus.*

Owl's clover, *Orthocarpus purpurascens.*

Catchfly, *Silene armeria.*

Scarlet flax, *Linum grandiflorum* 'Rubrum'.

Mexican sunflower, *Tithonia rotundifolia.*

California bluebell, *Phacelia campanularia.*

Texas bluebonnet, *Lupinus texensis.*

| Botanical Name<br>Common Name | How to Grow<br>Sun, Water, Plants/Seeds | Description<br>Mature Size Flowers Bloom Season |
|---|---|---|
| *Linum grandiflorum* 'Rubrum'<br>**SCARLET FLAX** | Seeds Fall | This annual wildflower grows rapidly 1 to 1-1/2 feet high, producing brilliant, scarlet flowers at ends of tall stems. Plant in well-drained soil in fall; it will not tolerate soggy soil during the cool season. Accepts full sun to partial shade. Blooms from spring into midsummer. Reseeds readily. |
| *Linum perenne* subspecies *lewisii*<br>**BLUE FLAX** | Seeds Fall | This annual wildflower produces a breathtaking bouquet of dazzling, sky-blue flowers that have a satiny sheen. They open every morning then fade in the afternoon heat. Plants grow to 2 feet high with a light, airy, vase shape that allows them to blend well with other wildflowers. |
| *Lupinus succulentus*<br>**ARROYO LUPINE** | Seeds Fall | An annual wildflower native to California. Showy, spiked, pealike, violet-blue flowers stand high above the lush green leaves, blooming in spring. Plants grow to 3 feet high and as wide. Sow seed in full sun in fall for flowers the following spring. Prefers well-drained soil. |
| *Lupinus texensis*<br>**TEXAS BLUEBONNET** ☆ | Seeds Fall | This annual wildflower is the state flower of Texas, and announces spring with sweeping masses of blue-plumed flowers along roadsides and in meadows. Plants grow 1 to 2 feet high. Germination can be sporadic but may be increased by purchasing scarified (scratched) seed. |
| *Orthocarpus purpurascens*<br>**OWL'S CLOVER** | Seeds Fall | Reliable wildflower for fast cover and color from early spring into summer. Suited to a natural border or in a wildflower mix. Grows to 8 inches high with rose-pink to purple, plumelike flowers that resemble those of clover. Sow seed in early fall in full sun to partial shade location. Reseeds well. |
| *Phacelia campanularia*<br>**CALIFORNIA BLUEBELL** ☆ | Seeds Fall | Prolific-blooming wildflower with rich, blue, bell-shaped flowers in early spring to early summer. Plants grow 6 to 18 inches high with lush-looking, dark green, fragrant, heart-shaped leaves. Contact with leaves may irritate the skin. Accepts most soils but performs best in rocky soils with good drainage. Reseeds itself. |
| *Silene armeria*<br>**CATCHFLY** | Seeds Fall | Summer-blooming wildflower, when most annual wildflowers are well past their peak. Pink to lavender flowers are borne in tight clusters on small bushy plants to 2 feet high. The individual flower petals are deeply notched. Accepts full sun to partial shade in almost any soil. |
| *Tithonia rotundifolia*<br>**MEXICAN SUNFLOWER** | Seeds Fall | Grows up to 6 feet high and to 3 feet wide. Large, orange or yellow sunflower blooms put on quite the show from midsummer until frost. Like Maximilian sunflower, use in back of the border. Attracts hummingbirds and swallowtail butterflies. |

# Landscapes & Special Gardens

Mild winters and ample sunshine are trademarks of the Coachella Valley, allowing many different kinds of plants to be grown successfully. In this chapter, you'll find detailed information on many types of gardens and plants, including roses, citrus, fruits, vegetables and lawns. You'll learn how to handle specific kinds of garden situations, such as landscaping around pools and patios, creating a wildlife habitat, and how to grow plants in containers. In addition, you'll find a detailed guide to help you give your garden an extreme makeover—creating a lush, attractive, water-efficient landscape.

## Planning Your Landscape

It can be difficult for many first-time desert residents to develop a plan of action for their new landscape. When you consider that they are working with unfamiliar plants in growing conditions that are downright hostile, this makes perfect sense! But that is the reason for this book. Gaining an understanding of each plant's character and mature size, and with some thoughtful planning, a pleasing landscape will emerge.

Begin by taking an inventory of what you have by creating a base plan of your lot. Making a scale drawing on graph paper is ideal, but even a sketch of what's in place and available space provides a working snapshot. Show the location of house, walks, patios and driveway slabs—all areas of hardscape that exist on your lot. Note that all hardscape areas should be in place before beginning any landscaping. In addition to walks and patios, note desired walls and fences. Include items on your plan such as utilities and access for trash receptacles. Mark the locations of any existing landscape plants or features that you want to keep.

Make several copies of this base plan. Now is the time to experiment with your ideas. Draw in all the different plants and gardens you might like, such as a vegetable or herb garden, shade trees, fruit trees, vines or water feature. Rough out areas within the space for functional additions such as a barbecue grill, seating for entertaining or pool or spa.

Adding a change in elevation adds interest. Natural-shaped earth mounds, a raised planter against the back wall or a dry creek bed to follow a slope are examples. These additions help set the stage for shrubs, groundcovers and accent plants you want to include.

Visit retail nurseries and botanical gardens for ideas. See the listings on pages 155 and 156 for locations of area gardens. Choose plants for their hardiness to cold, sun and water requirements, and mature height and spread. Research trees carefully—they represent a considerable investment in time and money, and you want to select just the right ones. Be aware of their maintenance and pruning requirements, including the amount of litter they typically create.

Before you even begin to think about digging planting holes, mark the locations of major plants with stakes. Use a garden hose or rope to outline proposed planting beds. Spend some time in the space "taking it all in" to be sure that the proposed design works for you. Go inside and look out your windows to imagine how the plants will look from that important viewpoint.

Left: Even though this is a recently installed landscape, including some larger plants helps give it a more finished appearance early on. Key plants include California fan palm, *Washingtonia filifera*, gray-blue century plant, *Agave americana*, and coral-red firecracker plant, *Russelia equisetiformis*.

Above: Special gardens include gardening in containers. Consider using non-traditional containers such as these. Containers can be home to just about every plant imaginable, and stretch the possibilities of what you can grow successfully.

A mass planting of firecracker plant, *Russelia equisetiformis,* commands your attention when it flowers in spring and early summer.

Be sure to provide enough space for the spread of mature plants. This agave must be trimmed back to remove the sharp spines from this walkway, ruining its form. Better to select a smaller agave species or locate it well away from traffic areas.

Adequate soil drainage is necessary to avoid areas of standing water in the landscape. Make the soil level next to hardscape areas 2 inches below grade.

Plan an irrigation system and layout after you determine plant locations. Drip irrigation with automatic valves water plants where and when they need it, reducing your water bill. (See pages 24 to 39.)

Plant to ensure the establishment and long-term health of your plants. See page 13 for a simple, step-by-step guide. Important: Don't skimp on the recommended amount of space between plants and adjacent buildings and hardscapes. Allow for their full mature growth even if plantings appear sparse at first. Fail to do this and you will pay the maintenance and pruning price for the life of your plants. If the bare spots bother you, add annuals and perennials as temporary fillers for a year or two until trees and shrubs begin to assert themselves. Planted in the right location and given regular water, their growth rate will be faster than you can imagine.

## Making a Small Landscape

Less *can* be more—more enjoyment and less work, as well as water. Even if you live on a small lot with limited garden space, it can be as beautiful and enjoyable as a garden in a large lot. Many of the same trees, shrubs, vines, groundcovers, annuals and perennials that grow successfully in large-scale gardens are compatible in smaller planting locations. As stressed previously, be sure you take into account mature plant sizes as you do your planning.

Due to the smaller area, gardening solutions must be more creative. Trees or shrubs that you can *espalier*—train against a wall or fence—provide one option. Especially consider including vines if one of your goals is to get the most out of your garden space. They can be trained up fences and walls to surround your home with color and cooling greenery, taking up little ground area. Also, look for dwarf species of popular plants. These are ideal in small space gardens.

## Giving Your Old Landscape a Makeover

Doing a makeover of an established landscape requires a thorough review of the site. This includes noting existing problems, then developing a theme or plan—including a budget—before beginning work. Follow the steps outlined in Planning Your Landscape, page 139.

Include in your calculations and planning as to how much longer you intend to live in your home. If you plan on staying three years or more, be more expansive with your makeover. If you will be selling your home in less than three years, it's probably more economical to tidy up the landscape, get rid of clutter, eliminate glaring problems and maintain it to its potential.

To develop a complete review for a potential makeover, consider hiring the services of an experienced landscape designer or landscape architect. A professional can define the scope of work, develop a time frame and prepare a budget.

As part of the makeover, evaluate the worthiness of all plants that are on site. Trees especially should

A lawn conversion in this front yard replaces monochromatic green grass with low-water-use accents, groundcovers and vines. Boulders and rock add interest and use zero water. A young Madagascar palm, *Pachypodium lamerei,* center, will reach 10 to 15 feet high, adding a vertical element to the scene.

A naturalistic grouping of boulders provides numerous nooks and crannies in which to locate accent and color plants. Burying boulders partway enhances the natural appearance. The overhead canopy from a palo verde tree, *Parkinsonia* species, produces partial shade to benefit plants beneath.

be carefully reviewed. Are they healthy? Is their height and spread in proportion to the available space? Are limbs rubbing against structures, or are roots lifting walks or walls? Are they well-adapted to the desert environment? Consider other plants as well. Have shrubs become woody? Has continual pruning all but eliminated flowering? Are there any plants on site that you simply do not like?

Visit your nursery to see if you would benefit from refreshing your landscape's plant palette. There is a constant flow of new, beautiful, water-efficient shrubs, trees, accent plants, groundcovers and bright flowering perennials coming on the market. Ornamental grasses, in particular, have expanded as a plant category. Their leaves and seedheads creating interesting flowing patterns, and add movement to the garden. (See pages 102 to 105.) Vertical accent plants, many of which are succulents, add their own brand of new visual impact. See Succulents, pages 112 to 123, for an array of choices.

If a lawn dominates your front yard scene, consider replacing it with interesting, natural-shaped contours and mounds planted with water-efficient flowering shrubs, perennials and groundcovers. Add some boulders and tuck accent plants into nooks and crannies. Now your once-common, monochromatic green grass yard is a visual feast for the eye. It will use about half the water as the lawn and attract wildlife to boot.

You can also choose to keep some lawn but reduce its size. This will cut back on water outlay, as well as time spent fertilizing, mowing and otherwise maintaining it.

## Some Landscape Makeover Solutions

- ❑ It is not always wrong to remove a tree, especially if it is causing problems. Remove trees in poor condition, problem trees, trees planted in the wrong place or trees at the end of their life span.
- ❑ Remove worn out evergreen shrubs and replant with desert-adapted flowering shrubs and perennials.
- ❑ Upgrade annual flowerbeds with small shrubs, which generally produce more flowers over a longer period. Perennials can also take the place of annual flowers. They produce color and are less costly than planting and replanting large beds of annuals.
- ❑ Replace or reduce the size of large wall-to-wall lawns with graceful, flowing plantings of perennials, ornamental grasses and accent plants.
- ❑ A well-constructed lawn edging contains the lawngrass and adds appealing definition to the landscape. Use pressure-treated wood or other landscaping timbers for edging, or durable edging such as metal, brick or concrete. Limiting the lawn perimeter and avoiding small, narrow or oddly shaped sections make it easier to irrigate and maintain.
- ❑ Artificial turf has improved in appearance and longevity in recent years. It can be an option to provide a splash of green color to a backyard. There are advantages and disadvantages to artificial turf. Do your homework before making a decision to determine if it's right for you and your situation.
- ❑ Upgrade and update your irrigation system. Replace old irrigation system nozzles with high efficiency nozzles and save 10 to 20 percent. Most PVC pipe irrigation systems are easy to convert to water-saving drip systems.

Another lawn conversion, only this site was a long side yard on a slope that was difficult to mow and maintain. Replacement plants include flowering shrubs, groundcovers, cacti and succulents. Watered by drip irrigation, these low- to moderate-water-use plants thrive on 50 percent less water that the grass they replaced.

A trio of extra-large boulders perform double duty by adding interest and elevation change while also providing erosion control and terracing to the site. Large accent plants add a finishing touch.

Bordering lawn with a clean edge enhances the overall appearance of your landscape and gives it a finished appearance. The contrast of rich green grass against light-colored mulch such as decomposed granite or rock can be highly attractive.

## Landscaping Near Pools and Patios

The areas around pools and patios are some of the most difficult places to landscape attractively and for low water and low maintenance. From a plant's point of view, such locations can be less than ideal for their health. Pools add reflected light from the water and hot concrete decking to the already seasonal high heat. Pool water treated with chlorine may splash on plants, injuring or killing them.

Patios are difficult because a portion of the earth for plant roots is covered by a large, non-porous surface. But there are still ample plants available for these sites, especially if you follow a few guidelines.

The landscape around a pool becomes more appealing when you use plants that are dramatic in form, texture or color. Avoid using plants with thorns, for obvious reasons, as well as those that produce high litter. All plants produce some litter, but some plants are messier than others. To reduce continuous problems with sweeping, raking and fishing leaves and debris out of the water, be sure the plants you select pass the low-litter test.

Palms are among the most favored trees for around pools. Consider trying some newer selections, such as *Brahea armata*, Mexican blue palm, or *Brahea edulis*, Guadalupe Island palm. Both are slow growing and typically remain under 20 feet high.

*Washingtonia filifera*, California fan palm, is a tried and true poolside tree. It grows slowly to 35 to 40 feet, with a massive trunk up to 3-1/2 feet in diameter. *Washingtonia robusta*, Mexican fan palm, is similar. By comparison, it has a slender, 18-inch trunk that can reach 50 to 75 feet high. This towering height makes it suitable only in large-scale landscapes.

For smaller gardens and for close-up viewing, consider *Chamaerops humilis*, Mediterranean fan palm. It is typically multi-trunked growing 8 to 12 feet high. Growth is slow. Welcome the pups, offshoot plants, which fill in around the base. Leave them on the palm to encourage growth to develop more vertically. This palm is also excellent when grown in containers.

Although palms are popular, there are a number of other evergreen trees and shrubs that are attractive around pools. Consider *Acacia aneura* or *Acacia craspedocarpa*, two low-litter species from Australia. *Acacia willardiana*, palo blanco, is native to Mexico. It will accept reflected sunlight and heat near pools and adds a graceful, weeping-willow-like feel, as does *Callistemon viminalis*, weeping bottle-brush. *Olneya tesota*, desert ironwood, *Sophora secundiflora*, Texas mountain laurel, and *Pistacia lentiscus*, mastic, are additional trees to consider for poolside plantings.

In planting areas near a pool, creeping groundcovers are both functional and visually appealing. Select species that root along the branches. This stabilizes the soil, which helps keep dirt from blowing into the

Palms, such as these California fan palms, *Washingtonia filifera*, are ideal poolside plants. They create a tropical mood and are practically litter free.

A patio can become another room that is part of your home. A mature mesquite tree provides necessary shade. Color plants make the space more inviting.

pool. Include some taller accent plants to partner with the groundcover to create more interest. Adding a few boulders or statuary completes the scene.

Many lush, flowing ornamental grasses are at home around pools, especially as a backdrop. Consider *Muhlenbergia* species, which are attractive almost year-round, and are low-litter plants. The section on ornamental grasses, pages 102 to 105, describes several others.

High-litter plants to avoid include oleander, bougainvillea, pyracantha, eucalyptus, ash, pines, mesquite and palo verde. If you want to include these plants for shade, screening, or other functions, it is best to place them 25 to 35 feet away, ideally on the downwind side of the pool.

For a final touch, install night lighting on palms and bold accent plants to enhance the pool landscape. The play of light reflecting on water and plants add a soothing and mysterious element to the landscape scene.

### *In a Desert-Friendly Garden*

Poolside Groundcovers

Flowering groundcovers near pools offer eye-catching color, and many bloom for long periods. Consider *Chrysactinia mexicana*, damianita, *Convolvulus cneorum*, silver bush morning glory, *Oenothera stubbei*, saltillo primrose, *Ruellia brittoniana* 'Katie,' dwarf ruellia, and the creeping evergreen herbs, *Rosmarinus officinalis* 'Prostratus', prostrate rosemary, and *Teucrium chamaedrys* 'Prostratum', prostrate germander.

## Consider Your Patio an Outdoor Room

Think of your patio as another room of your home, with walls, ceiling and views. Many times it becomes the most favorite room in the house! There is nothing more enjoyable than relaxing on your own patio with a morning beverage, the birds singing in the wildlife oasis you've created around you. Come back to the patio in the evening and enjoy the company of friends as you grill some steaks for dinner.

Creating intimacy in a patio of any size merits close attention to detail when selecting and placing plants. A patio area provides an opportunity to become your own private mini-oasis. As part, one of your goals is to select plants that have colors and textures that are appealing when viewed up close.

Flowering vines, espaliered plants and fragrant color plants in containers add special interest at the edges of the patio area. If the rest of your garden is low maintenance, these are prime locations to showcase plants that you enjoy the most: a small herb garden, vegetables in containers, or dramatic tropical or subtropical plants.

Fill beds at the edges of the patio with flowering perennials or annuals to add their bright, gem-like effects. Also consider bonsai plants for their up-close appeal. Although you want planting beds near the patio where you can most enjoy them, provide plenty of sufficient space for walkways and paths to reach other parts of the yard. Also factor in easy access to other features, such as table and chairs, grill, pool or spa.

## Small Lawns for Landscapes

Reducing an existing lawn area or making new lawn installations smaller than typical in the past helps curtail water use. Yet even a small lawn provides an important surface for play and visual relief from the earth tones of the desert. If you do have a lawn or are planning one for a new landscape, ask your nursery or sod grower about the current crop of water-conserving lawngrasses and how to water and maintain them.

In the Coachella Valley, the most easily grown grasses are the permanent, warm-season Bermudagrasses. They are seeded—common Bermuda only, or sodded—hybrids, such as the 'Tif' series. Hybrid Bermudagrass provides a close-knit carpet that wears well. Its seed is sterile, so it must be planted from sod or stolons. Some hybrid varieties are slow growing so less frequent mowing is required.

Hybrids are fast becoming the favorites, due to their finer texture and richer color. Indeed, some communities do not permit common Bermudagrass plantings due to its multiple problems. Common Bermudagrass readily goes to flower, producing highly allergenic pollen. It also reseeds, and is an aggressive spreader, becoming a weedy, invasive nuisance in other plantings. Color and texture are not as attractive. Hybrid Bermudagrass is highly preferable.

Many types of grasses have been tested, but, to date, few show much promise. Buffalograss from Texas and northern Mexico may have the potential to be a high-quality, warm-season turf with better winter color than Bermudagrass, eliminating the need for overseeding in winter.

## Container Gardens

Container plants on your desert patio, at the entrance to your home or around the pool allow for immediate gardening gratification. Containers take center stage to showcase your favorite plants, and allow you to enjoy them at close range. Popular choices include colorful annuals, bulbs and fragrant flowering perennials or even shrubs.

The portable container garden can move with you from one home to another. If containers are not too heavy or placed on casters, they can be moved to accommodate changes in the weather or the season. Move to protect them from extremes in cold weather in winter, or to a shaded location as the heat and sun intensity increases in the summer.

Containers are a wonderful way to enjoy a diversity of plants particularly if your home is on a small lot. Large containers placed side by side can function as a screen or divide a garden or outdoor area. Containers also elevate plants to a height that is easier to reach—especially helpful for folks that have trouble bending and crouching. When it comes to vegetable or herb gardening in containers, the dreaded chore of weeding is practically eliminated. In addition, many vegetables and herbs have an attractive, ornamental quality that you can feature in a container.

### Not all Containers are Created Equal

Select containers that are best adapted to deal with problems associated with our desert heat. Containers can be

Bordering a lawn with a clean edge adds that "something extra" to the landscape, giving it a finished appearance. This lawn is small so it requires much less water, fertilizer and care than a typical lawn, yet it still provides cool, green relief.

The owner of this large backyard has taken full advantage of the expansive landscape space. Rather than installing wall-to-wall lawn, this multi-use area includes a dedicated playground structure, trike and bike track, and several raised planter beds.

porous, which allows evaporation of moisture through the sides. Porous materials include unglazed clay, terra cotta or wood. Care must be taken that these types do not lose moisture too rapidly during warm periods of the year. However, if you water plants regularly, porous containers are more forgiving than non-porous ones.

Non-porous containers include those made of porcelain, glazed ceramic and plastic. They allow less evaporation through the sides. It is easier to overwater these types of containers because evaporation of water is reduced. All containers must have a drainage hole or you run the risk of killing the plant with constantly saturated soil.

### Soil for Containers

Most container plants are generally forgiving when it comes to soils. Combining one-third ground bark, peat moss, or composted planter mix, one-third coarse sand, and one-third garden soil can make a general-purpose soil mix. Blend all into a loose, friable mixture and moisten before you plant. Or purchase ready-made mixes at your nursery or home center store. Many brands of packaged mixes are available at nurseries and garden centers.

Succulents, particularly cacti, require excellent drainage and generally less acidic soil. Create a mixture of one-third garden soil, one-third porous matter such as perlite or vermiculite, and one-third sand.

Despite what many of us were taught years ago, new research shows that it is detrimental to put anything other than soil into pots. These include stones, gravel, and pot sherds or anything in the bottom—they actually slow drainage. If you feel you must cover the drainage hole, cover it with a piece of old window screen or nylon stocking.

Leave space at the top of the container—one to three inches—depending on the size of the container and type of plant. This allows room for each application of water. With each irrigation, water should flow through the soil mix with new plantings as well as saturating the rootball of established plants.

If water is flowing out of the container bottom too rapidly, the soil may have shrinkage due to excessive

Plant and container combinations are limited only by your imagination.
Top left: Queen Victoria agave, *Agave victoria-reginae,* in a terracotta pot.
Left: Kitchen herbs are perfectly at home in a weathered wooden toolbox.
Above: A wheelbarrow past its prime is resurrected as a creative container for spring annuals.

root growth. Water may not be penetrating the rootball but merely moving around and down the sides of the container, doing the plant little good. When this occurs, it's time to replant with fresh soil in a larger container.

Top-dressing the container soil is an option. Top-dressing is adding inert material in a 1- to 2-inch layer over the soil. Pea gravel, small lava rock or smooth river stones are topdressing materials. It reduces evaporation, prevents crusting of the soil, reduces water splash and improves appearance.

Apply fertilizer more frequently for plants in containers than for those in the ground. More frequent irrigations cause nutrients to be flushed from the container soil at a more rapid rate. Measure and apply carefully according to label directions. Liquid types of organic fertilizers work best. Moisten soil prior to application. Don't add more fertilizer beyond the label recommendation thinking "a little more" will help. Overfertilizing kills plants. For cacti and succulents, use fertilizer at half strength.

### Plants for Containers

Containers can be used as a home for a single plant, or become a miniature garden with a multitude of different plants. Ideally you should match colors and shapes of pots to the plants you place in the container.

For a pleasing blend of plants, the adage is "accent, filler and spiller." Place an upright accent plant in the center, add filler around it and a spiller to cascade over the edge. This can be done with just about any plant combinations that share the same water requirements. Use succulents, perennials, annuals, bulbs or an enticing blend of vegetables and herbs.

Containers are the most effective way to enjoy certain plants that are otherwise not good candidates for growing in the desert. Plants that require acid soils and do not adapt well to treated soils such as camellias, gardenias and azaleas fall into this category. They generally do better in porous pots that evaporate through the sides.

## Vegetable Gardens

The Coachella Valley offers a wonderful climate for growing vegetables and fruits. Indeed, fruits and vegetables are grown commercially in the valley and shipped all over the world. Growing conditions for vegetables are most favorable during fall, winter and into spring. Summer vegetables are more difficult to grow, but with the right heat-loving varieties and proper cultural practices, these too can be successful.

If you are a new gardener or new to the desert, it is best to begin with a fall garden. Gardening in fall is more forgiving without the extreme summer heat, and you're more likely to enjoy harvests that will be tasty and abundant. Keep in mind that even winter-grown gardens need irrigation on a regular basis.

Ideally, plan on *succession planting* your vegetables. This means sowing new seeds or setting out young plants every three weeks or so, not all at once. This staggers and extends harvest times and so avoids having an overabundance of produce at one time.

It is possible to grow many vegetables in a small plot, in containers, in borders or along a wall or fence. Select

Wooden half-barrels are rustic, inexpensive and will hold plenty of soil to grow almost anything, including a summer crop of tomatoes.

Raised beds can be constructed in a number of ways. Wood, railroad ties and cinder blocks are some commonly used materials. Because it is not too wide, every section of this vegetable garden is easy to reach.

an exposure where vegetables will receive at least six hours of sun every day.

Prepare soil well in advance of planting. Remove rocks, weeds and debris. Add ample amounts of organic material such as compost or forest mulch to improve the structure of the soil. Apply a layer 2 to 3 inches deep and mix thoroughly into the top 8 to 10 inches of soil. Grade to create a smooth and level bed ready for planting. Water soil slowly so moisture reaches to about 2 feet deep.

Consider installing a raised bed garden, surrounded by a low wall made of blocks, railroad ties or similar materials. Make them wide enough to provide a seating ledge. This type of garden is easy to manage and is a valuable "back-saver" when planting, weeding, watering and harvesting.

When sowing seeds directly into the garden, be aware that each seed has a preferred planting depth. You'll find directions on seed packets. Don't plant too deep. After planting, tamp the soil firmly and water well. Use a fine-mist sprinkler or hose attachment to avoid disturbing or washing out the seeds. Continue to sprinkle soil lightly on a regular basis until seeds germinate and seedlings produce three or four leaves. At this stage begin watering with a soaker hose or irrigation system. Check the soil for moisture every day. Dig down at least 6 inches deep and feel if the soil is moist. Be consistent with watering. Even a short dry spell can slow or interrupt the growth process, which can reduce or even eliminate the amount and quality of harvests.

### Planting a Winter Vegetable Garden

The time to begin planting a winter garden is mid-September. To get a jump on the season, you can start seeds indoors in August. September is a prime-planting month for most plants. The soil remains warm and cooler temperatures that are soon to come are ideal for growing green leafy vegetables and root crops. Select from beets, carrots, endive, leeks, lettuce, and green onions, radishes, spinach, turnips, broccoli, Brussels sprouts, cabbage, chard, mustard and peas. This is also the best time to grow cool-season garden herbs such as cilantro, chives, parsley, dill and fennel.

### Planting a Summer Vegetable Garden

Beginning in February, you can plant many of the warm-season crops. These include onions, garlic, potatoes, tomatoes, sweet corn, squash, gourds, eggplant, peppers and melons. The prime summer herb is basil. Many summer vegetables are handsome ornamentals and can be mixed into flowerbeds.

Plant seeds or set out young plants from packs or containers after all danger of frost has passed. In the Coachella Valley the average dates for the last frost can range from late January to early March, but the official date for last frost is March 1. Seedlings and plants in 4-inch pots are usually available at local nurseries during this time, ready to plant. Don't set out a large number of plants unless you have homes for the resulting produce. Just a few plants of most vegetables will produce enough harvests for average home use.

A winter vegetable garden is composed of cool-season crops such as green leafy vegetables and root crops. You'll likely have greater success with a winter garden than one in summer. The mild temperatures in the winter and early spring months are ideal for plant growth.

Due to the extreme heat, a summer garden can be challenging, but some gardeners consider it worth it. If growing tomatoes, for example, select short-season varieties and plant early to reach harvest time before the hottest days of summer arrive.

Because intense heat is coming all too soon, select varieties that are early maturing and heat tolerant. Native varieties of crops, rather than hybrids, often do better. A number of seed companies are now providing desert-adapted varieties of common vegetables.

## Fruits—Trees and More

A wide variety of fruit- and nut-producing plants grow well in our desert, and can be done successfully without an orchard-sized lot. Many trees, shrubs and vines are double-duty plants—fulfilling a function in the landscape while also providing delicious harvests. Apricot, citrus, date, elderberry, fig, grape, olive, peach, pear, pecan, persimmon, pistachio, plum, pomegranate and exotic tropicals such as guava, pineapple guava, natal plum, loquat (Japanese medlar), and jaboticaba are candidates. Avocado could be included as well but may not survive our periodic freezes. A number of native plants provide edible fruit, including prickly pear, cholla, squawberry, wolfberry, saguaro and velvet mesquite, the seedpods from which can be ground into a sweet flour.

### Deciduous Fruit Trees

Deciduous trees, those that drop their leaves in winter, are often placed in the background of the landscape to diminish the look of their bare branches. It is an excellent practice to locate deciduous trees along a south-facing wall. Deciduous trees provide summer cooling with their canopy of leaves, which shade your home. Bare branches in winter allow the sun to shine through, providing natural warmth. Figs and pomegranates, described in the following, are the best choices for this energy-saving practice.

**Figs—**Silvery gray bark and lush green leaves place figs at the top of the list for an oasis landscape. If your landscape space is limited, figs can be espaliered. There are at least ten commonly grown varieties of figs, and all do well in the Coachella Valley. Selection then becomes a matter of taste.

'Mission' is the most dependable, all-around fig, typically producing two crops per year. Fruit has black skin. Use fresh, dried or preserved. 'Kadota' has yellow skin and amber pulp. Fruit is good when dried. 'Brown Turkey' is best eaten fresh.

**Pomegranates—**A succulent fruit from ancient times, pomegranates have been grown in low-elevation deserts for millennia. They tolerate alkaline soils well, and add year-round interest to the landscape. (See page 61.) Spring brings large, vivid red flowers, followed by ruby red fruit against brilliant green foliage. Fall foliage is golden yellow, and in winter, the bare branches and trunks show off their smooth, silver-gray bark.

Plant bare-root trees in December, January and February. Set out container-grown plants any time, with fall the best period. It is important to plant pomegranates in full sun.

Regular deep irrigation is required for crop production. Selectively prune one-third of the previous year's growth each winter, or trees become too twiggy.

'Wonderful' is an improved selection generally grown as a large shrub to 10 feet high and as wide.

**Peaches and Nectarines—**Select from low-chill varieties of peaches such as 'Blazing Gold', 'Gold Dust',

Pomegranate, *Punica granatum,* is a triple-threat plant: It is an attractive ornamental tree or shrub in the landscape, it produces large, bright red flowers that remind one of carnations, and finishes the growing season by providing its tasty, bright red fruit.

When irrigating citrus, water deep and wide at the drip line area of trees. Keep moisture away from the trunk to prevent gummosis disease. As the tree grows, continue to extend the edges of the basin so that it is slightly wider than the spread of branches.

'Desert Gold' and 'Babcock.' Dwarf 'Bonanza Peach' eventually reaches 6 feet high. Its mature size is suited to border areas, or even grow it in a large container. Old favorites such as 'Elberta' and 'J. H. Hale' are not adapted to our low desert climate.

## Citrus

Citrus trees are abundant in their offerings to desert gardeners, with lush, evergreen foliage, fragrant flowers and decorative, tasty fruit. High heat required by most citrus is easily met in the Coachella Valley. Full flavor and juiciness develop better here than almost anywhere.

### Planting New Citrus Trees

Citrus plants need deep, well-drained soil. In frost-free areas they can be planted any time. In colder parts of the Valley, wait to plant in mid-March, after danger of frost has passed.

When planting more than one tree in an average-sized garden, space grapefruit 20 feet apart; most other citrus 15 feet apart. Plant in a warm location—in full sun or with some afternoon shade.

**Irrigating Newly Planted Citrus—**Build a basin around newly planted plants at least 4 feet in diameter with sides about 6 inches high. For March-planted trees, fill basin and soak soil to 2 feet deep at least twice a week from March to May. Soak to 3 feet deep about twice a week June through September. Extend watering frequency to every 10 to 12 days during winter months. By the following March, the tree can be considered established regarding irrigation so water as a mature tree at that time.

*In a Desert-Friendly Garden*

Fertilizing Citrus

Make the first application of a complete citrus fertilizer in February to help set blossoms. Follow with one application per month until September. At a minimum, use these holidays as a reminder to fertilize: Easter, Memorial Day and Labor Day. Apply fertilizer according to product label directions. Dissolve in water or spread dry fertilizer evenly across the watering basin and water thoroughly.

**Irrigating Mature Citrus—**After trees are established, maintain a dry area about 12 inches in diameter around the base of the trunk. Slightly raise the soil level so that the basin tapers down and away from the trunk, preventing water from coming in regular contact with the trunk. This reduces the chance of gummosis, a disease that can kill plants. Continue to extend the edges of the basin as the tree grows so that it is slightly wider than the spread of branches. See photo opposite.

Irrigate citrus until moisture penetrates the soil to a depth of 3 to 4 feet. Allow the soil to become mostly dry before watering again. As a guide, water established trees in sandy soils every 10 to 14 days from March through May. Water once a week from June through September. Water every two to three weeks from October through February. Reduce frequency of irrigations slightly for trees planted in heavier clay soils.

If in doubt about how much and when to water, check the soil for moisture. One way check irrigation depth is with a *soil probe*. This is a long, metal rod (purchased or handmade) that can be pushed into the soil. It penetrates as deeply as the moisture, stopping when it reaches dry soil.

Apply mulch materials—bark, planter mix, even rocks and gravel, to name a few, over the basin area to keep roots cool, reduce water loss through evaporation and to suppress weed growth. A 3-inch layer of mulch will keep roots 8°F to 10°F cooler. This also helps suppress digging or cultivating in the root zone, which will disturb surface roots. Keep mulch well away from trunk to reduce providing an environment that encourages gummosis disease.

If citrus are growing in a lawn, it is best to keep grass from growing beneath the tree's canopy. Create a basin, cover with mulch and water deeply, as recommended above. Try to avoid or at least reduce the spray from lawn sprinklers hitting trees.

## Adding a Dry Creek to Your Landscape

Many landscapes, large or small, benefit from the visual interest of a unique landscape feature—a dry creek bed. A dry creek bed identifies the landscape as truly southwest, simulating the arroyos of our local foothills.

This feature has the added benefit of reducing or eliminating lawn areas, provides a means for drainage and creates a focal point and setting of a natural habitat. Properly placed flowering accent plants, small shrubs, groundcovers and wildflowers complement natural placement of boulders, rocks and pebbles.

Begin by creating a meandering swale 1-1/2 to 2 feet deep and 3 to 5 feet wide. Adding a natural-shaped mound at the head of the creek produces a slight drop in elevation, enhancing the effect. Line the bottom and sides with 3- to 6-inch stones bolstered with clusters of 1- to 2-foot diameter boulders along edges. Avoid making it too symmetrical; your goal is to emulate what you would see in nature. Bury rocks and boulders one-quarter to one-third of their depth for a more natural effect.

A natural scene such as this, enhanced with adapted perennials and wildflowers, complements other plantings. An added bonus is that many of these plants reseed readily, reinforcing the natural appearance. The boulders and rock provide plenty of nooks and crannies to encourage seeds to germinate.

## Creating a Wildlife Habitat

Every living creature needs water, food and shelter to survive. If you provide these in your landscape, wildlife are sure to come. No matter how distant our urban areas are removed from nature, a surprising number of creatures will discover your wildlife habitat. If you are unsure of how to begin, start small in a corner of your landscape, then expand as you begin to see what works and what doesn't work. Include as many plants as possible that are native to the desert. Locate habitat in a quiet, more remote part of the garden, where trees and plants can grow unhampered. Unpruned or lightly pruned forms provide the food and shelter wildlife seek. Allow plants to grow naturally, leaving branches that reach to the ground, unpruned. Dense branches and stems create safe places for hiding, resting and nesting.

Hummingbirds are welcome visitors to the wildlife garden. This hummer is feeding on the nectar of chuparosa, *Justicia californica*.

Water is a necessary element in a wildlife habitat. A water source can be as simple as a slow dripping faucet, a small, shallow fountain or a shallow water dish, such as a large decorative plant saucer.

Plants provide food for wildlife without our even noticing it. Nectar, seeds, fruit and larval food for butterflies are all important in the wildlife garden. Plants also nurture numerous different species of insects that are not pests, yet are important food sources for many species of birds. For example, hummingbirds require insect protein to lay eggs and raise their young. Their tiny nests will fall apart if ample spider webbing is not included in the construction.

Wildflowers and perennials with deep-throated, brightly colored flowers full of nectar are essential to attract hummingbirds and butterflies. Groundcovers such as lantana and verbena are loved by butterflies. Flowers and grasses that produce seeds become

A dry creek bed adds a focal point in the landscape. In addition, it can serve as a retention basin for rainfall runoff, benefiting nearby plants.

The same dry creek bed at left, adorned with wildflowers after just one season. Featured are yellow desert marigold, *Baileya multiradiata,* purple moss verbena, *Glandularia pulchella,* and magenta Parry's penstemon, *Penstemon parryi.*

dependable food sources for seed-eating birds such as quail, dove and lesser goldfinch.

A bird feeder or two may be fine to interest small birds, but avoid broadcasting great quantities of seed or grain on the ground. This often merely attracts larger birds and pigeons, which can stress the habitat and bird population. It may also attract undesirable rodents and the snakes that prey on them.

As the garden ages, the soil becomes enriched, developing an ideal home for earthworms, lizards and other soil-related animals and insects. They help develop a balanced food cycle for all the residents. With an environment in balance, roadrunners, quail, thrashers and other native birds keep snails, slugs and insect pests under control.

The list on this page provides just a sampling of arid land plants to help create your wildlife habitat. Also note which plants attract or shelter wildlife as you read through Desert-Friendly Plants, pages 40 to 137.

## Plants for Wildlife Habitats in the Coachella Valley

### TREES FOR SHADE AND RESTING

*Acacia berlandieri*, Guajillo
*Chilopsis linearis*, Desert Willow
*Lysiloma watsonii* var. *thornberi*, Feather Tree
*Olneya tesota*, Desert Ironwood
*Parkinsonia florida*, Blue Palo Verde
*Prosopis velutina*, Velvet Mesquite
*Vitex agnus-castus*, Chaste Tree

### SHRUBS FOR NECTAR, SEED AND SHELTER

*Anisacanthus* species, Desert Honeysuckle
*Atriplex canescens*, Four-Wing Saltbush
*Buddleia marrubifolia*, Woolly Butterfly Bush
*Cleome isomeris*, Bladderpod
*Calliandra* species, Fairy Duster
*Encelia farinosa*, Brittlebush
*Justicia* species, Chuparosa and Shrimp Plant
*Punica granatum,* Pomegranate
*Tecomaria capensis*, Cape Honeysuckle

### FLOWERS FOR SEED AND NECTAR

*Aquilegia* species, Columbine
*Baileya multiradiata*, Desert Marigold
*Dalea* species, Dalea (groundcover forms)
*Epilobium canum*, California Fuchsia
*Lantana* species, Lantana (groundcover forms)
*Penstemon* species, Penstemon, Bearded Tongue
*Salvia* species, Sage
*Zinnia acerosa*, Desert Zinnia

### VINES FOR FOOD AND NECTAR

*Campsis radicans*, Trumpet Vine
*Passiflora* species, Passionflower
*Rosa banksiae*, Lady Banks' Rose

### CACTI AND SUCCULENTS FOR NECTAR AND SEED

*Aloe* species, Aloes
*Asclepias linearis*, Threadleaf Milkweed
*Asclepias subulata*, Desert Milkweed
*Carnegiea gigantea*, Saguaro
*Ferocactus* species, Barrel Cactus
*Fouquieria splendens*, Ocotillo
*Hesperaloe parviflora*, Red Yucca
*Opuntia* species, Prickly Pear

### ORNAMENTAL GRASSES FOR NESTING MATERIAL

More than two dozen quail find food and refuge in this wildlife garden.

When you create a wildlife garden, it becomes a situation of "build it and they will come."

# Glossary

**Acid, Acidic [soil]**—Having a pH value below 7. See pH.

**Alkaline [soil]**—A pH value above 7. See pH.

**Alluvial [soil, slopes]**—Areas of "young" rocky soils, typically at the bases of mountains.

**Alternate [leaves]**—Borne singly at each node, in a spiral up a stem.

**Angiosperm**—Plant that has its seeds enclosed in an ovary.

**Annual**—Plant that completes its life cycle in one season or one year.

**Anther**—Part of a stamen that produces pollen, usually borne on a filament.

**Apex**—Tip or growing point of an organ such as a shoot or branch tip.

**Aquatic**—Plant that grows in water.

**Architectural**—Plants that have strong and often spectacular shapes.

**Backfill**—Soil that is returned to planting hole to fill in around rootball of plant.

**Bare Root**—Plants that are sold without soil around their roots, which occurs when they are dormant. Roses and certain deciduous fruit trees are examples.

**BARE ROOT**
Prune away dead or broken roots before planting bare root plants.

**Beneficial Insects**—Insects that prey and feed on insect pests that attack garden plants.

**Biennial**—Plant that completes its life cycle in two years, usually flowering and fruiting the second year.

**Blow Sand**—Sand that is blown into an area, propelled by strong winds. Can damage plants and property if wind velocity is too high.

**Bolt**—To produce flowers and seed, sometimes prematurely, such as "bolt to seed."

**Bract**—Modified leaves that may take on the appearance of flower petals. Bracts are usually green but can be conspicuous and colorful such as those of bougainvillea.

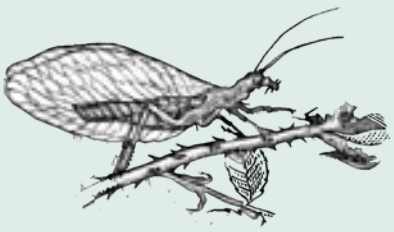
**BRACTS**
Bracts are modified leaves that can be colorful, such as bougainvillea.

**Bud**—Rudimentary or condensed shoot containing embryonic leaves and or flowers.

**Caliche**—Soil condition created when a deposit of calcium carbonate is located beneath the soil surface. Found throughout the Southwest.

**Canopy Coverage**—The amount of shaded area in square feet that a plant will cover when it is fully grown. Data is useful if you participate in a lawn/turf replacement program. Each plant's description in this book lists its canopy coverage number.

**Chlorosis**—Nutrient deficiency in plants. Indicated by leaves that have a yellowish cast. Iron chlorosis is common in the Southwest U.S.



**BENEFICIAL INSECTS**
Benefical insects include lacewing.

**CIMIS**—California Irrigation Management Information System. Computer-generated information from weather stations across the state record and disseminate data to help determine a plant's water need.

**Compost**—Mixture of decomposed vegetative matter, useful for amending soil, mulching and fertilizing.

**Controller**—Regulates when and how much water is applied via an irrigation system. Also known as a timer.

**Crown**—Place on a plant where roots and stems join. Important to position most plants with the crown just slightly above soil level when planting to prevent rot.

**Cultivar**—Cultivated variety of a plant, rather than a variety that occurs naturally in the wild. Properly designated with single quotation marks around the name, or with the abbreviation "cv."

**Cuttings**—Sometimes called "slips." Portions of stem or root that can be induced to form roots and develop into new plants.

**Deadhead**—Removing flower heads after they are past prime, which can encourage more flowers.

**Deciduous**—Leaves drop during dormant season of year. Plant almost appears to die but regrows the next season.

**Division**—Propagation by dividing a clump into several parts, often done while plant is dormant.

**Dormant, Dormancy**—Plant that is alive but is not actively growing.

**Drainage**—Water movement through the soil, in regard to plant roots. Sandy soils are fast-draining; clay soils drain slowly.

**Drip Irrigation**—System where water is delivered (dripped) to plants at their root zones by emitters.

**Drip Line**—Imaginary area around a tree or shrub that marks its widest growth. So called because rain tends to drip from plant leaves to the ground at its drip line.

**Drought Tolerant**—Inherent ability of a plant to survive without water for long periods of time.

**DEADHEADING**
Deadhead flowers to improve appearance of plantings.

**Emitter**—Irrigation equipment that allows water to be applied slowly to plant roots in controlled increments, such as 1-gallon, 2-gallon or 5-gallon. Also called drip emitter.

**Espalier**—A tree, shrub or vine trained (pruned) to grow flat against a wall or trellis.

**Establish**—Time it requires a plant to adjust to its life in the ground after planting and produce good root and top growth. Most plants are considered *established* after living and growing through two summer seasons.

**Evapotranspiration (ET)**—Evaporation of moisture from a leaf's surface. The ET rate for a given plant is the amount of moisture it needs to sustain itself.

**Evergreen**—Plant that has green foliage throughout the year.

**Family**—A biological classification. All members of a plant family share certain characteristics that are not found in other families. Also see Genus.

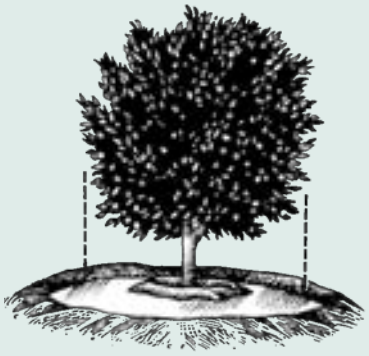
**Feeder Roots**—Roots that absorb moisture and nutrients for a plant, typically located at the perimeter of a plant at and beyond its drip line.

**DRAINAGE**
Soil type greatly affects soil drainage. By comparison from left: sandy, loam and clay soils.

**Floret**—Small, individual flower in the flowerheads of such plants as broccoli or sunflower.

**Flower**—Reproductive unit of an angiosperm. The basic flower forms are ***single***, with one row of usually 3 to 6 petals; ***semidouble***, with more petals, usually in two rows; ***double***, with many petals in several rows and few or no stamens; and ***fully double***, usually rounded in shape, with densely packed petals and with stamens obscured.

**Foliage**—A plant's leaves.



**DRIP LINE**
Irrigate plants at this imaginary line and beyond, where feeder roots are located.

**Genus**—Most important subdivision of a plant or animal family, designated by the first word in the botanical name. In ***Punica granatum***, pomegranate, *Punica* is the genus, and *granatum* is the species. Also see Species.

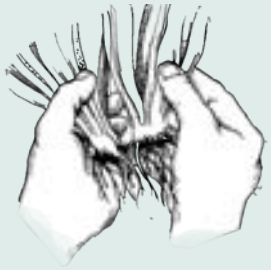
**Growing Season**—Days between last frost and first frost. In the Coachella Valley the average growing season is approximately 330 days.

**Habit (growth, flowering)**—The natural form or tendencies of a plant. For example, typical growth habits are compact, upright or spreading.

**Harden Off**—To gradually adjust (harden) plant tissues to colder temperatures. Common when plants from a nursery greenhouse are brought home.

**Hardpan**—See Caliche.

**Hardscape**—Part of the landscape that cannot absorb water, such as sidewalks, patios, rooftops and driveways.



**DIVISION**
Divide plants such as daylilies to gain new plants and to help maintain plant health.

**Hardy, Cold Hardy**—Describes a plant's resistance to, or tolerance of, frost or freezing temperatures (as in "hardy to 20°F"). The word does not mean tough, pest resistant or disease resistant. Also see Tender.

**Heading**—also called Topping. Removing limbs and branches at arbitrary height, which ruins the tree's form.

**Herbaceous**—In a general sense, plants having nonwoody tissues.

**Hybrid**—Offspring of genetically different parents, usually produced accidentally or artificially in cultivation. Rarely occurs in the wild. See Cultivar.

**Hydrozoning**—Grouping and placing plants in a landscape according to water requirement. Typical zones are high, moderate and low.

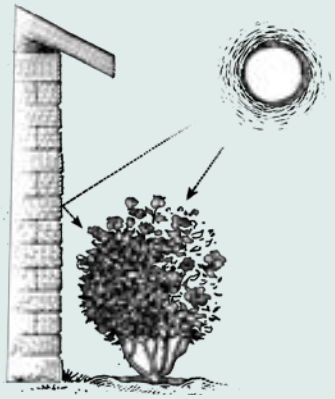
**Leach, Leaching**—The washing action of rainfall or irrigation water to move nutrients or salts from the upper layers of soil where plant roots are located.

**MULCH**
Mulches are simple and inexpensive, and make it easier to remove weeds.

**Leader**—In a single-trunk shrub or tree, the central, upward-growing stem.

**Leggy**—A condition when plant stems are spindly and elongated, stretching upward. Often caused by insufficient sunlight.

**Loam**—Well-structured, fertile soil that is moisture retentive and well drained.



**MICROCLIMATE**
Use the small climates that exist around your home to grow cold-tender plants.

**Microclimate**—A small climate that differs from a surrounding large climate zone. Can be as small as a cooler location beneath a canopy tree compared to a warm exposure against a south-facing wall.

**Mulch**—A layer of material applied to the soil, often over a plant's root zone to conserve moisture, protect the roots from temperature extremes and reduce weed growth. Organic mulches decompose to enrich the soil.

**Native Plant**—A plant that occurs naturally in the wild in a given region.

**Naturalize**—Plants that spread on their own to grow in an area. For example, wildflowers can reseed to naturalize in a given location.

**Organic Matter**—Materials blended into soil to improve plant growth. Compost, bark products and peat moss are examples.

**Overseed**—As warm-season grasses such as Bermuda go dormant and turn brown in early winter, cool-season grasses such as annual or perennial rye are seeded over the lawn.

**Perennial**—Plant that lives for at least three seasons, typically flowering every year. Usually herbaceous (nonwoody).

**Petiole**—The stalk to which a leaf is attached.

**pH, pH Scale**—A measure of soil acidity or alkalinity. 0-6.9 is acid; 7 is neutral, 7.1-14 is alkaline.

**Rhizome**—Underground stem that lives for more than one season. Iris produce rhizomes.

**Runner**—Horizontally spreading stem that forms roots at nodes. Often confused with stolon.

**Runoff**—When the volume of rainfall or irrigation is too great for the soil to absorb and water is wasted as it "runs off."

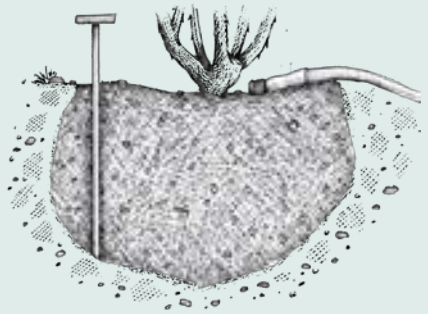
**Self-Seed, Self-Sow**—Dropping or freely distributing plant seeds, from which new plants grow the following season.

**Soil Probe**—A device (usually a metal rod) that is pushed into moistened soil to gauge how deeply moisture has penetrated into the soil.

**Species**—Plants having certain differences from other plants within the same genus. The second name in a plant's botanical name. Also see Genus.

**Stolon**—Stem that grows horizontally along the ground, taking root at intervals, often forming new plants where it roots.

**SELF SOW**
Harvest seedheads of plants that self sow to distribute seeds where you want new plants to grow.



**SOIL PROBE**
A probe such as a metal rod pushed into the soil shows how deep moisture has penetrated.

**Sucker**—Plant growth that appears different from other stems and branches, often from the roots of a grafted plant. Sucker growth should be removed, especially if below the graft union of roses and fruit trees.

**Tender, Cold Tender**—Susceptible to cold temperature damage, as compared to Hardy.

**Transitional Garden**—Plants with low to moderate water needs that blend with and create a transition between a high-water garden and low-water plants on the landscape perimeter.

**Umbel**—Clusters of florets resembling an umbrella supported by small stems that seem to rise from the same point.

**Variegated**—Leaves are marked with patches or streaks of different colors.

**Variety**—Naturally occurring variation of a species. Abbreviated as var. or v.

**Windbreak**—Planting of trees and shrubs to block, filter or deflect the wind.

**Windthrow**—A plant, usually a tree, uprooted by strong winds.

**Xeriscape**—A method of landscaping that uses common-sense plant selection and maintenance principles to save water while enhancing our surroundings.

# Resources

In addition to this book, many other valuable resources and reference materials are available; several are listed here.

## Web Sites

Online searches for "desert landscaping" and "water conservation" will lead you to numerous web sites for more information. Here are a few to get you started.

www.cvwd.org

The Coachella Valley Water District web site includes an interactive site featuring hundreds of additional photos of the plants discussed in this book. Look under *Conservation* for "Desert-Friendly Plants."

www.cvwd.org/216/Tips-for-Residents

This site offers water-saving tips for valley residents. Topics include links to how-to videos, conservation laws and emergency drought conservation information.

www.cvwatercounts.com

Sponsored by area water utilities, this site features a broad range of information on water conservation, including current utility rebates.

www.deserthorticulturalsociety.org/

This site is packed with information on plants and horticulture in the Coachella Valley. The stated goal of the society is to "…promote the use of an attractive, environmentally stable landscape."

http://ucanr.edu/sites/RiversideMG/

University of California Cooperative Extension Master Gardener Program for Riverside County. Gardening questions answered by calling 951-683-6491 x 231, or 760-342-6437.

www.wildflower.org

The web site of the Ladybird Johnson Wildflower Center in Austin, Texas. Includes information on several thousand plants native to the U.S.

## Books

Books are available on more gardening topics than you can imagine—too numerous to mention here. The titles below are reliable references and handy to have on the home bookshelf.

***Landscape Plants for Dry Regions***, Warren Jones and Charles Sacamano, Perseus Publishing, Cambridge, Mass.

***Landscape Plants for California Gardens,*** Bob Perry, Land Design Publishing, San Dimas, Calif.

***Native Plants for Southwestern Landscapes***, Judy Mielke, University of Texas Press, Austin, Texas

***The New Sunset Western Garden Book,*** Sunset Publishing, Menlo Park, Calif.

***Western Garden Edibles,*** Sunset Publishing, Menlo Park, Calif.

David Harbison Lush & Efficient Garden, Coachella Valley Water District.

## Public Gardens

Arboretums and botanic gardens are excellent sources of information and ideas on plant selection, landscaping and water conservation.

**Important:** Pertinent information on the gardens such as hours, fees and available facilities are subject to change. Many gardens are not open every day, and are closed certain holidays. Phone ahead or check the garden's web site for the most up-to-date information.

### Coachella Valley Area Gardens

**Coachella Valley Water District**

Avenue 52 at Hwy 111
Coachella, Calif. 92236
760-398-2651

Demonstration gardens are available for public viewing at the Coachella office (address above). No entrance fee.

**College of the Desert Arboretum**

43-500 Monterey Avenue
Palm Desert, Calif. 92260
760-773-2561

This campus-wide arboretum is in continuous development. Students actively take part in the planting.

**Desert Water Agency**

1200 S. Gene Autry Trail
Palm Springs, Calif. 92264
760-323-4971

www.dwa.org/Xeriscape

DWA headquarters, on Gene Autry Trail, is landscaped with water-efficient plants. The link above shows before and after photos of the landscape renovation at the agency's offices. No entrance fee.


Desert Water Agency.

**Eric Johnson Memorial Garden**

72567 Highway 111
Palm Desert, Calif.
760-346-5600

The Eric Johnson Memorial Garden is part of the Palm Springs Art Museum in Palm Desert. This attraction is also known locally as the Faye Sarkowsky Sculpture Garden. Winding paths take you through oasis-like plantings and water features framed with native desert plants. No entrance fee.

**The Living Desert Zoo and Gardens**

47-900 Portola Avenue
Palm Desert, Calif. 92260
760-346-5694

www.livingdesert.org.

Horticultural and landscape plant displays, featuring native plants as well as plants from Australia, Africa, South America and Asia. Entrance fee required.

**Moorten Botanical Garden**

1701 S. Palm Canyon Dr.
Palm Springs, Calif. 92264
760-327-6555

www.moortenbotanicalgarden.com

Established in 1938, displays feature more than 3,000 plant varieties from deserts around the world. Entrance fee required.

**Sunnylands Center & Gardens**

37977 Bob Hope Drive
Rancho Mirage, CA 92270
760-202-2222
www.sunnylands.org

Sunnylands Center & Gardens are free to visit during operating hours. Online advance purchase is required to tour the historic home.

## Southern California Area Gardens

**Chino Basin Water Conservation District Water-wise Demonstration Garden**

4594 San Bernardino Street
Montclair, Calif. 91763
909-626-2711

www.cbwcd.org/9/Water-Wise-Demonstration-Garden

Almost 2 acres of model gardens, including a Southwest Garden, a Woodland Garden, a Mediterranean Garden, and a lawngrass demonstration area. No entrance fee.

**Los Angeles State & County Arboretum**

301 North Baldwin Ave.
Arcadia, Calif. 91007
626-821-3222

www.arboretum.org

Over 127 acres of landscaped grounds demonstration gardens, including a Water Conservation Garden, plant collections and historic buildings. Entrance fee required.

**Rancho Santa Ana Botanic Garden**

1500 North College Ave.
Claremont, Calif. 91711
909-625-8767


Sunnylands Center & Gardens.

www.rsabg.org

86 acres of native California plants, including more than 2,800 species. Entrance fee.

**Theodore Payne Foundation for Wild Flowers and Native Plants**

10459 Tuxford Street
Sun Valley, Calif. 91352
818-768-1802

www.theodorepayne.org

This is a learning and information center and nursery for more than 800 plant species, including rare and endangered plants. No entrance fee.


Chino Basin Water Conservation District Water-wise Demonstration Garden.

**UCR Botanic Gardens**

University of California,
Riverside Campus
Riverside, Calif. 92521
951-784-6962

www.gardens.ucr.edu

Gardens and open space cover almost 40 acres of hilly terrain, and contains over 3,500 plant species. Entrance and parking fee required.

**Western Municipal Water District: Landscapes Southern California Style**

450 East Alessandro Blvd.
Riverside, Calif. 92508
951-789-5087

A 1-acre, water-wise demonstration garden designed for self-guided tours. Shows how to save water, time and money. No entrance fee.

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# Create a *Desert-Friendly* Landscape

*For ideas on creating a desert-friendly landscape, visit the David Harbison Lush & Efficient Garden, Coachella Valley Water District, in Coachella. See pages 155 and 156 for more information on area public gardens.*

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