



# Succulents and Cactus

Southern California has had a long love affair with succulents and cacti. And it's no wonder. These plants provide dramatic statements, energizing colors, and exciting forms—all for low water and maintenance costs. There is a lot to love.

A succulent is a plant that actively stores water in its stem, leaves and roots. All cacti are succulents, but not all succulents are cacti. Cactus is distinguished from other succulents by its spines and hairs. Cactus spines grow in clumps, succulents do not. These clumps of spines and hairs are the places where new flowers and growth comes from; succulents do not bloom or grow in this manner.

As a general rule: succulents do better along the coast, where there is little danger of frost and freeze. Cactus does better inland, where there is less danger of moisture and rot. This chapter provides notes on individual plant care, which includes right type of soil, irrigation, mulches, fertilization, pruning, pests and propagation. Scientifically speaking, not every plant in this chapter is a succulent, but they've been included here because they are often treated like one.



Variiegated blue agave, *Aloe arborescens*, blue chalk fingers (*Senecio mandraliscae*) and *Cotyledon orbiculata* (in the background) creates a dynamic landscape that requires little maintenance and water.

# General Growing Tips

Below are general guidelines for growing succulents and includes information on soils, irrigation, mulches, fertilization, pruning, pests and propagation. Following this section are specific recommendations for individual succulents.

## Soil

Good drainage is paramount to success. Succulents generally prefer gritty soils and suffer in too much clay. Most favor soils with neutral pH to slightly acidic (6 to 7 pH). Not surprisingly, many Southwestern succulents, like *Dudleya* and yucca, grow well in slightly alkaline soils. Succulents generally have low to moderate nutrient needs and dislike nutrient-rich, bacteria dominated soils.

### If Too Sandy

Add organic material, the best being wood chips, mulch and compost. Avoid humus.

### If Too Clayey

Add a combination of wood chips, grit (small gravel) and compost to at least 12". Other effective additives include gravel, mulch, perlite, pumice, and sharp sand.

## Irrigation

Succulents are low-water plants—cactus even more so—but they are irrigated differently than other drought-adapted plants. While most have extensive roots, their roots are typically shallow. Succulents and cactus generally prefer a light watering at more frequent intervals. And, because of their extensive roots, make sure to irrigate beyond the plant's drip line. Importantly, do not irrigate during periods of high humidity.

Not all succulents/cacti need irrigation; however others will need it year round. Generally succulents do better along the coast and cactus inland.

### Little to No Summer Water

*Aeonium, Agave, Cotyledon, Dudleya, Escobaria, Ferocactus, Haworthia, Lemaireocereus, Nolina, Opuntia, Senecio, Yucca*

### No Winter Water

*Aloe, Escobaria, Euphorbia, Ferocactus, Lemaireocereus, Opuntia*

### May Need Year Round Water

*Beaucarnea, Bulbine, Calandrinia, Crassula, Dadyliron, Echeveria, Epiphyllum, Furcraea, Gasteria, Pachyphytum, Portulacaria, Sedum, Sempervivum*

### Quick Guide to Watering Succulents

- Do not water when foggy, overcast, or when there is high humidity.
- Water in the morning so the foliage can dry before night.
- If a succulent looks plump, colorful and juicy, it probably does not need water.
- If it looks listless, shriveled, or its leaves are bending downward, then it probably needs water.
- Rainwater is preferable because it is slightly acidic and soft and contains no salts and chemicals.

### Signs of Overwatering

Leaves will show yellowish colors, translucent hues, and/or greyish tones.

Leaves and stems are swollen and split.

Insect and weed problems are prevalent.

Damage from overwatering is often irreversible; under-watering, generally not. Remedies include shutting off irrigation, pulling back mulches to expose and heat the soil, and pruning to increase sun exposure and airflow.



Many clues indicate this agave, sea fig, and coral tree are being overwatered; the leaves are too swollen, the leaf color is too rich, and the decomposed granite is water stained.

## Mulches

Mulches reduce the need for irrigation. All mulches, including rock, reduce soil evaporation. However, organic mulches are not always best. If the area is in shade, high humidity, and near the coast, then organics can encourage rot and pest problems. Pea gravel, gravel, grit, river rock, sharp sand, and decomposed granite might be better options in these environments.



Chipped granite is used as mulch in this succulent garden along the coast. Newport Beach City Hall, Newport Beach.

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**Note:** *The use of mulch can disguise overwatering. Allowing the soil to dry between watering is essential for healthy succulents and the look of mulch rarely offer clues to the condition of the soil. If mulch is used, then you will need to frequently scrap back the material to gauge soil moisture.* ■

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## Fertilization

Succulents need fertilizers infrequently in urban areas; cactus rarely ever. Urban soils are often nutrient-loaded from years of over-fertilization and decades of decaying roots. Even car exhaust, laden with vital nutrients (like nitrogen), contributes.

Typically, an application of wood chips, mulch or compost is needed yearly or every other year. If fertilizing with supplements, use a mild well-balanced fertilizer with equal amounts of nitrogen, phosphorous and potassium. A mixture of 3-3-3 is best. A good all-purpose organic fertilizer is 1 part blood meal, 1 part bone meal and 2 parts greensand. Spread 5lbs per 100sf.

### Quick Fertilizing Tips

- Always water before fertilizing.
- Never fertilize a succulent during its dormant period (which could be winter or summer depending on the species).
- Never fertilize a sick or dry plant.
- Never fertilize directly after planting.
- It is always better to fertilize too little than too much.

## Pruning

Pruning is vital to long-term health. It helps maintain air circulation, reduces overcrowding, and removes crossing stems and branches, all of which improves vigor and reduces pest problems.

Not all succulents and cacti need regular pruning, but some do. *Aeonium*, *Aloe*, *Agave*, *Euphorbia*, ice plant, *Opuntia*, *Portulacaria*, and *Senecio* will demand yearly attention. Dead material needs to be removed, the pups (vegetated starts) will have to be thinned and/or transplanted, and some succulents need constant containing.

**The Monocarpic Group:** There are many succulents that die after blooming. This group is called monocarpic. While an annual will do this in a year or less, an agave can take up to 100. The banana is the best known member of this unique group. Some of the most widely grown monocarpic succulents in Southern California are *Agave*, many *Aeoniums*, *Bromeliad*, *Furcraea*, and a couple of species of *Yucca*. As soon as a monocarpic begins to bloom, plans for its replacement should begin.

**Legginess:** Some succulents get leggy with age. This is especially evident with *Aeonium* and *Echeveria*. These plants can become ugly as their trunks become long and lanky. Cut off the leafy sections 3" to 4" below the leaves, dry them for a week, and then replant the first 2" of the stems in the ground. Cut down the remaining trunk 1" from the ground. There's a 50% chance it will resprout. See Propagation below.



Dead and dying leaves have been removed, excess pups from the *Agave* pulled, and the *Aloe* has been pruned to keep it down. Energy Resource Center, Downey.

## Dressing for Success

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From long and barbed thorns to toxic sap, succulents have a slew of ways of torturing gardeners and landscapers. Come prepared. Wearing the right clothes will greatly reduce injury.

- **Eye Protection:** Eye protection is absolutely mandatory—the spines of *Agave*, *Opuntia* and *Yucca* are often hard to see, yet deadly. Goggles are best.
- **Leather Gloves:** Few materials offer the protection of leather. Thorns can't penetrate and sap can't seep through. If constantly working around these plants, invest in rose pruning gloves, which also protect most of the forearm.
- **Long-Sleeved Shirt:** A sturdy shirt will deter the most common injury—scraps and punctures along the arms. Naturally, the thicker the fabric, the greater the protection.
- **Long Sturdy Pants:** Only long pants will do—shorts offer little protection and skirts get caught up.
- **Boots:** Spines can easily penetrate the soles and sides of tennis shoes. Strong leather work-boots provide the greatest protection and confidence.
- **Baseball Cap:** Not only does the thick fabric provide protection from spines, but the cap's bill prevents the head from getting too close to the plant. Large shade hats can get caught.



Eye protection, long leather gloves, baseball cap, long-sleeved shirt, sturdy long pants, and tough shoes means that this gardener is serious about personal health.

## Pests

Aphids, gophers, mealybugs, mites, nematodes, rabbits, rats, rot, scale, slugs, snails and thrips are the most common pests of succulents and cacti. However, grown in the right conditions, succulents and cacti are generally pest-free. Urban areas, unfortunately, rarely offer just the right conditions. Pests are more likely when a plant is overwatered, over-fertilized, the air is too humid or too still, and/or the plant is too coated in dust and urban grime. (Please refer to the chapter on Natural Pest Control for specific strategies).

Many of the natural strategies for controlling pests involve human contact, which is problematic for this group of plants because they often have adaptations that repel large mammals, which of course, includes us. Consequently, chemical insecticides—both contact and systemic—are frequently recommended. But, as it turns out, many of these chemicals create other problems. The oily chemicals increase chances of sunburn and the systemics can harm beneficial insects, including the plant's pollinator. For these reasons, chemical insecticides have limited success on succulents and cactus. The best defense is an effective offense—growing healthy plants.



Cochineal has a stranglehold on this pancake cactus. Some experts, though, claim that the scale-like insect deters other, more damaging pests, and may actually improve the health of *Opuntia* spp. in the long run.

## Maintain Health for Pest Protection

- Do not overwater, or irrigate during times of high humidity.
- Do not fertilize unless there's a physical indicator that it is needed.
- Increase air circulation.
- Wash foliage.
- Take measures immediately; do not let a problem get a stranglehold.

## Weeds

Succulent and cactus landscapes are ripe for urban weeds and there are always plenty. Succulents are generally not aggressive enough to out-compete weeds. Weeding these types of landscapes poses two problems. First, pulling weeds by hand can be treacherous to the gardener. Second, if herbicides come in contact with these plants, injury to the plants is likely as they are sensitive.

There are three strategies for weeding succulent landscapes: First, keep the first two inches of the soil as dry as possible. This minimizes opportunities for germination. Second, control the site's weeds before they set seed. Third, use a preemergent herbicide. These chemicals are practical for large plots of matting succulents, places where physically weeding can easily cause injury to the plant.



Ever the opportunist, spurge is a tenacious and common weed in succulent landscapes.

## Propagation

Propagation rarely falls to the people maintaining commercial properties, community associations, or municipal landscapes, but succulents and cacti might change that. Propagating these plants is easy and economically viable. They require the least amount of time, resources, and expertise to propagate and have the highest success rate.

The timing of propagation is essential to success. Most succulents are winter dormant and the best time to propagate is in late winter/spring. Summer dormant succulents, such as *Aeonium*, *Haworthia*, *Sempervivum* and *Senecio*, are propagated in fall. Propagation is easiest when temperatures range from 65° to 75° F.

There are four quick ways to propagate: divisions, leaf starts, pups and stem cuttings.

### Divisions

Much like clumping grasses, some succulents produce new growth from their base, growing outward. Of these, the most commonly divided succulents include *Bulbine* and *Sansevieria*.

#### As a Rule

1. Begin in cool weather.
2. Moisten soil to 1' deep; do not over saturate.
3. Dig up plant, starting 4" to 6" from the plant's base.
4. If not dividing immediately, moisten, cover and shade the roots.
5. Cut the clump in half or thirds with a sharp knife or pruning saw.
6. Plant the divisions immediately.
7. Moisten the soil to 1' deep.
8. If drainage is good, moisten soil twice a week; if dense, moisten only once a week.
9. Put on normal irrigation schedule in 4 weeks.



These aloe divisions were just potted.

## Leaf Starts

*Aeonium*, *Echeveria*, *Gasteria*, *Graptoveria*, *Haworthia*, *Kalanchoe*, *Opuntia* and *Sempervivum* are some of the popular succulents that can be started by leaf cuttings.

### As a Rule

1. Cut a leaf at its joint. If possible, make the cut at an angle to prevent water collecting on the parent plant.
2. Place leaf in warm dry location to heal the wound. Do not plant until callused, which for some of the larger cacti can take up to a month.
3. Once wound is callused, place cutting into rooting medium or soil deep enough to prevent the leaf from toppling over, typically about 2". The rooting medium should contain little organic material.
4. Irrigate to keep the soil just slightly moist.
5. The plant will root in 4 to 8 weeks and show the signs by new growth.
6. Move the plant to the field and begin normal irrigation.



Young pads cut from pancake cactus (*Opuntia*). The pads were then placed in a dry and shaded area to let the wounds callous over.



The callused end of the *Opuntia* pad 9 days after the cut.

## Pups (Offsets)

*Aeonium*, *Agaves*, *Aloe*, *Cotyledon*, *Crassula*, *Echeveria*, *Furcraea*, *Gasteria*, *Haworthia*, *Sedum*, *Sempervivum* and *Yucca* are the most popular succulents that produce vegetated starts (baby plants) at their bases. These pups can easily be pulled off and planted.



This blue agave has many pups that can be cut away and planted elsewhere on the property. At least one or two pups should be kept as soon as the monocarpic plant starts blooming because it will shortly die. Self Realization Temple and Gardens, Encinitas.

### As a Rule

1. Pull or clip pups from parent plant.
2. Trim broken or damaged roots to  $\frac{3}{4}$ " of the crown.
3. Push the pups into soil or rooting medium.
4. Lightly water twice a week.
5. In 4 weeks the plant will have enough roots to either be moved or go on a normal irrigation schedule.

### Stem Cuttings

Stems can easily be used to start new plants. Some of the plants started by stem cuttings are *Aeonium*, *Dudleya*, *Echeveria*, *Euphorbia*, ice plants, *Kalanchoe*, *Opuntia*, *Pedilanthus*, *Portulacaria*, *Sansevieria*, *Senecio*, *Sedum* and *Sempervivum*. Columnar cacti can be cut and rooted and treated much the same as stem cuttings.

### As a Rule

1. Cut long stems, preferably young ones.
2. Cut stem into 5" sections (columnar cactus a foot or more).
3. Remove leaves from bottom 2".
4. If the stem doesn't have leaves, mark its top with a pen or small slash; cuttings will not root if planted upside down.
5. Place stems in dry, warm environment until the wounds callus over, about 2 to 10 days (although columnar cactus can take a month or more).
6. Once callused, plant the stem in the soil or rooting medium.
7. If the plant is dormant, wait to water until temperatures exceed 70°F.
8. Begin normal irrigation when plant is actively in the growing season.



This bed of *Aeonium* would be reinvigorated if the stems were cut and replanted.

### Situations that Cause the Most Problems

- Poor Drainage
- Frost and Freeze
- Watering: Overwater or Underwatering
- Poor Air Circulation
- Hard Water
- Overcrowding
- Overhead Irrigation

# Individual Plant Care

The plants below are listed by their botanic names. At the end of this chapter is a list of these plants by their common name.

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**Note:** *Irrigation requirements are expressed in the amount of inches a soil should dry before receiving supplemental water. Naturally, if a soil never dries to prescribed depth, which is not uncommon during monsoons, then the plant requires no irrigation.* ■

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## **Aeonium spp.**

Ground covers to shrub size. Needs more water and nutrients than most succulents. Summer dormant. Although they remain attractive drying to 5" in summer, their dormant season, the rest of the year they look better and bloom more if they dry to only 3". Moderate nutrient needs; yearly application of mulch and compost may be needed. Some varieties are monocarpic and will die after flowering.

## **Agave spp.**

Ground covers to large shrub size. Tough and durable plants. Can dry to 9" throughout the year, but are more attractive if they only dry to 6" in summer. Low nutrient needs; nothing more than wood chips, mulch and gravel are needed. Monocarpic. Propagate from profuse pups.

## **Aloe spp.**

Ground covers to tree-height. Tough. Can grow in nearly every Southern California garden, but they are not as drought tolerant as some other succulents. Dry to 4" in spring, 6" in summer and fall. No irrigation in winter. Moderate nutrient needs; mulch, compost and/or diluted balanced organic fertilizers will be needed. Propagate from pups, and stem and leaf cuttings. Prune, propagate and plant late winter/early spring.

## **Beaucarnea spp.** Ponytail Palm, Elephant's Foot

Tree size. Beaucarnea can dry to 6", but be aware that can happen quickly because of the plant's size and also the coarse soil required to grow it well. Along the coast it may not need irrigation winter through early spring. Too much water creates lackluster growth and a variety of pest problems. Low to moderate nutrient needs; only wood chips, mulch and compost are needed.

**Bulbine spp.**

Ground covers to low shrub size. Summer dormant. Although bulbine can survive with little water, it has better year round appearance if soil never dries to more than 4". Low nutrient needs; wood chips, mulch and compost should suffice. Divide and plant in fall/early winter.

**Calandrinia grandiflora, C. spectabilis** Rock purslane

Shrub size. Tough. Can tolerate drought and poor soils, but looks much better when only drying to 4" between waterings. Moderate nutrient needs and will grow well with nothing more than yearly mulch or compost, although a well-balanced organic fertilizer may improve the appearance of the foliage. Prune and plant winter/early spring.

**Cotyledon spp.**

Ground covers. Dry to only 3" in summer, but 4" to 6" the rest of the year. If in shade, it only requires irrigation in summer. Avoid overhead watering because it washes off attractive and protective white powder. Low nutrient needs; nothing more than wood chips, mulch and compost are needed. Prune, propagate and plant in late winter/spring.

**Crassula spp.**

Ground covers to shrub size. Although tough, and can dry up to 6" throughout the year, they look better if they never dry to more than 4" in summer. Low nutrient needs; mulch and compost will suffice. Easy to propagate and plant in late winter/spring. A few varieties are monocarpic.

**Cylindropuntia spp.** Cholla

Shrub to tree size. Incredibly hardy in the deserts of Southern California. Dry to 1' in spring and summer. No irrigation the rest of the year. High humidity will kill this plant. Low nutrient needs; nothing more than a light layer of gravel and wood chips is needed. Prune, propagate and plant in late winter/early spring.

**Dasyliion spp.** Mexican grass tree, desert spoon. Refer to chapter on Shrubs.

***Dracaena draco*** Dragon tree

Tree size. Drought-adapted. Dries to 6" year around, but, unlike a majority of the other plants in this chapter, Dragon Tree needs deep irrigation—to 2'. Moderate nutrient needs; compost, humus and well-balanced organic supplements may be needed yearly. The dragon tree prefers slightly acidic soils. A slow grower and more water and fertilizer will not speed the plant.

***Dudleya* spp.** Liveforevers

Ground covers. Like a true Southern California native, *Dudleya* likes its moisture in the winter and spring. Along the coast dry to 4" during winter/spring and 1' in summer; if inland, dry to 4" winter/spring, and 6" summer. No irrigation in fall either along the coast or inland. Exceptionally low nutrient needs; nothing more than a light layer of gravel and wood chips are necessary. Propagate from pups and leaf cuttings in late winter/early spring.

***Echeveria* spp.**

Ground covers. One of the few succulents that grows better with regular water and rich soil. Dry to 2" to 4" summer through fall, depending on distance from coast, and 6" to 9" winter through spring. Moderate nutrient needs; because of its matting nature, liquid fertilizers and concentrated organics powders, such as a mix of animal meals, are best. Prune, divide, propagate and plant late winter/early spring.

***Escobaria* spp.** Pincushion cactus

Low growers to shrub size. Exceptionally drought tolerant. Dries to a 1'. Will rot in anything but gravelly soils. Low nutrient needs. Does well in slightly alkaline soils.

***Euphorbia* spp.**

Ground covers to tree size. A spring and summer grower, it dries to 4" during those seasons, and to 6" in fall. No irrigation in winter. Low to moderate nutrient needs; yearly compost and mild well-balanced organic fertilizers may be required. Prune, propagate and plant in late winter.

***Ferocactus* spp.** Barrel cactus

Shrub size. Incredibly tough. Dry to 1' or more in summer. No irrigation the rest of the year. Needs very sharp drainage—anything less than gravelly soil will kill it. Exceptionally low nutrient needs; wood chips, used sparingly, is all that is needed. Weeds and weeding are a problem in urban areas.

***Fouquieria splendens*** Ocotillo

Shrub size. Ocotillos are monsoon-adapted. They should dry to no more than 6" in the spring and summer. No irrigation the rest of the year. Suffers greatly in clay soils. Low nutrient needs; wood chips and mulch are sufficient. Plant in fall and winter.

***Furcraea foetida*** Mauritius hemp

Large shrub size. Dry to 6" along coast but to only 3" in hot inland areas. Moderate nutrient needs; compost and well-balanced organic supplements may be needed occasionally. Monocarpic. Plant in late fall/winter. Salt sensitive which will be evident from brown-edged leaves. Sunburns and blanches if grown in a sunny area too far inland. Propagate from pups in early spring.

***Gasteria* spp.**

Ground cover. Tough plants but not as drought-tolerant as some other succulents. Dry to 3" throughout spring and summer, 4" to 5" in fall. No irrigation in winter. Low nutrient needs; wood chips, mulch, and compost will suffice. Prune, propagate and plant late winter/early spring. If leaves are discolored and plant looks listless, it is likely receiving too much sun. Replace and/or relocate to shadier spot.

***Graptopetalum paraguayense*** Ghost plant

Ground covers. Summer grower. Dry to 6" in spring and fall, 3" to 4" in summer. No irrigation in winter. Moderate nutrient needs; compost and well-balanced organic supplements may be required every other year. Apply in early spring. Propagate by pushing wayward stems into the soil in late fall/winter. Plant in early spring.

***Graptoveria* spp.**

Ground covers. Summer grower. Dries to 4" in summer, 6" in spring and fall. No winter irrigation. Moderate nutrient needs; mulch and a light well-balanced organic fertilizer may be needed early spring yearly. Propagate and plant late winter/early spring. Can be propagated by leaf and stem cuttings.

***Haworthia***

Ground covers. Summer dormant. Can dry to 1' during that time of year, but only to 4" in winter and spring. No irrigation in winter. Low nutrients needs. However, because of its dense matting nature, a well-balanced organic liquid may be needed occasionally. Favors a little shade and will show signs of sunburn if it is not provided. Propagate and plant in late fall/winter.

**Hesperaloe spp.** False yucca, Red yucca, Giant yucca

Shrub size. Drought-adapted. Only needs irrigation during the summer months, dry to 6". No irrigation the rest of the year. One of the few succulents to tolerate clay soils, but the soil must absolutely dry between waterings. Low to moderate nutrient needs; all that is required is yearly mulch or compost. Deadhead early summer. Plant in late winter/early spring.

**Kalanchoe spp.**

Ground covers to almost tree size. Tropical, but tough. Dry to only 4" in summer, but 6" in spring and fall. No irrigation during winter. Low to moderate nutrient needs (depending on species); mulches will be needed, plus an occasional well-balanced organic supplement. Prune, propagate and plant late fall/winter.

**Nolina spp.** Beargrass

Shrub size. A tough group with many species native to the southeastern part of Southern California. Dry to at least 6" spring and summer. No irrigation fall and winter. Low nutrient needs; a light layer of gravel and wood chips will do. Can rot along the coast. Plant in late winter/spring.

**Opuntia spp.** Pancake cactus, Prickly pear

Shrub to almost tree size. A coastal group of plants that thrive in gravelly soil and maritime moisture. Along the coast dry to 6" in spring, to 1' in summer. No irrigation in fall and winter. In the hotter inland areas dry to 4" in spring, 6" in summer. No irrigation fall or winter. Low nutrient needs; wood chips and mulch will do. A strand that is too dense or has too much dead material is more likely to have pest problems; periodic cleaning and rejuvenation is essential. Prune, propagate and plant in late fall/winter.

**Pedilanthus spp.** Slipper plant

Shrub size. Tough and durable. Dry to 1' in spring and summer along the coast, to 6" inland. No irrigation in fall or winter. Low nutrient needs; wood chips are all that is needed. Prone to rot in moist soils and climates. Prone to sunburn inland. Plant in late winter/early spring.

**Portulacaria afra** Elephant food

Shrub height. Tough and durable. Dry to 6" in spring and summer, and, if along the coast or in shade, needs no irrigation the rest of the year. Dry to 1' in fall and winter in the hotter interior. Low nutrient needs; wood chips and mulch will do. Prune to contain, improve structure and increase air circulation in late winter/early spring. Propagate and plant in winter through spring.

**Sansevieria spp.** Snake plant or Mother-In-law's tongue

Low shrub size. Durable. Can dry to 4" in spring and summer, 6" in fall. No irrigation in winter. Low to moderate nutrient needs; compost is usually all that is needed, but liquid organic concentrates are typically used because this plant is rarely placed in areas compatible to composts. Can sunburn inland. Divide and plant in late winter/spring.

**Sedum spp.** Stonecrop

Mostly ground covers, but some to shrub size. Although aggressive and successful in urban areas, they are not as drought adapted as other succulents. Dry to only 4" throughout the year for best results. Moderate nutrient needs; mulch, compost and well-balanced organic supplements may be needed yearly. Prune, propagate and plant late in late winter/early spring.

**Sempervivum spp.** Houseleek, Hens and chicks

Ground covers. Winter growers and summer dormant. Soil should not dry to more than 4" in late fall through early spring. Can dry to 6" in summer. Moderate nutrient needs; compost and well-balanced organic supplements may be needed yearly. Prune, propagate and plant in late fall/early winter.

**Senecio mandraliscae, S. serpens** Blue chalk fingers

Rooting ground cover. Winter grower. Soil can dry to 6" in summer and fall, but only 4" in spring. Dry to 6" or more in shade. No irrigation in winter. Moderate feeders; compost and a light well-balanced organic supplement every other year may improve appearance. Prune, propagate and plant in late fall/early winter.

**Senecio spp.**

Ground covers to shrubs and perennials. Winter growers. Soil can dry to 6" year around. Moderate feeders; compost and a light well-balanced organic supplement may be needed yearly. Prune, propagate and plant in late fall/early winter.

**Yucca spp.** Yucca

Low shrub to tree size. Several varieties are native to Southern California. One of the toughest group of succulents. Dry to 1' during summer. May not need irrigation the rest of the year. Low nutrient needs; only a layer of gravel or wood chips is needed. Pull dead leaves from the trunk and deadhead mid-summer. *Y. whipplei* is the only Yucca that dies after blooming (monocarpic).

# Ice Plants

Ice plants are different from other trailing succulents. They are a Mesemb. All have daisy-like flowers, and a majority spread and root. Mesembs can be aggressive and have migrated to natural areas. Some varieties accumulate salts and will create a toxic environment to other plants over time. Mesembs are generally avoided.

If Mesembs are already planted, they prefer a consistent level of moisture throughout the year. They do best when irrigation is light but frequent. They can absorb moisture through their leaves and should never be irrigated in times of high humidity, no matter the temperature. Drainage is essential for all succulents and Mesembs favor gritty and gravelly soils low in digestible nutrients. While they do best in soils with neutral pH, they will tolerate a range if the drainage is good.

Mesembs includes the following species: *Aptenia cordifolia* (red apple), *Cephalophyllum* (red spike ice plant), *Delosperma* spp., *Drosanthemum* spp. (rosea ice plant), *Lampranthus* spp. (trailing ice plant), *Malephora* spp. (*Croceum* ice plant).

## Common Names to Botanical

*Aeonium* spp.  
*Agave* spp.  
*Aloe* spp.  
 Barrel cactus *Ferocactus*  
 Beargrass *Nolina* spp.  
 Blue chalk fingers *Senecio mandraliscae*, *S. serpens*  
*Bulbine* spp.  
*Cotyledon* spp.  
 Cholla *Cylindropuntia* spp.  
*Crassula* spp.  
*Croceum* ice plant *Malephora crocea*  
 Dragon tree *Dracaena draco*  
*Echeveria* spp.  
 Elephant food *Portulacaria afra*  
*Euphorbia* spp.  
*Gasteria* spp.  
 Ghost plant *Graptopetalum paraguayense*  
*Hesperaloe* spp.  
*Haworthia* spp.

Houseleek, Hens and chicks *Sempervivum* spp.  
Ice plant *Delosperma* spp.  
*Kalanchoe* spp.  
Liveforevers *Dudleya* spp.  
Mauritius hemp *Furcraea foetida*  
Ocotillo *Fouquieria splendens*  
Pancake cactus, Prickly pear *Opuntia* spp.  
Pincushion cactus *Escobaria* spp.  
Ponytail palm, Elephant's foot tree *Beaucarnea* spp.  
Red apple *Aptenia cordifolia*  
Red spike ice plant *Cephalophyllum*  
Rock purslane *Calandrinia grandiflora*, *C. spectabilis*  
Rosea ice plant *Drosanthemum* 'Red Spike'  
Slipper plant *Pedilanthus* spp.  
Snake plant or mother-In-law tongue *Sansevieria* spp.  
Stonecrop *Sedum* spp.  
Trailing ice plant *Lampranthus* spp.  
*Yucca* spp.