

Growing cactus and succulents in the Chicago area

Thoughts on growing cactus and succulents in the Chicago area

by Bill Abel

—long time cactus and succulent grower for sales and personal collection in the SW Michigan to Chicago area since the 1970s

What are cactus and succulents?

Cactus is a word that pops; it catches people's attention. But *succulents* is the more meaningful word. Succulence refers to some part of a plant being swollen to store water (and 'food'—the two go together to some degree in that a cactus stores a higher percentage of water whereas a tulip bulb storage contains a higher percentage of 'food'). This water is, of course, stored in specialized cells, and is not pure, any more than our blood is pure water, and enables the plant's survival of some period of dryness/drought. Succulence manifests as swollen/fat leaves, stems and roots or a combination of these. Cactus and succulents are generally thought of as desert plants. But there are many other situations that can encourage succulence such as rocky outcrops ranging from bare surface rocks to mountains, growth on trees (epiphytes), and areas with pronounced rainy and dry seasons such as the savannahs of Africa. Even mild rainy-dry and/or cold-warm seasons can have succulents mostly in the form of 'bulbs' like tulips and onions.

Most cactus and succulents are 'flowering' plants. One broad estimate suggests that of the approximately 200,000 species of flowering plants, perhaps about 10,000 may be considered 'cactus and succulents'. There are many, many families of plants showing some degree of succulence. Among these, the Cactus family, *Cactaceae*, may be most prominent, accounting for perhaps 1600 of those 10,000 species. It is commonly said that all cacti are succulent, but only a few succulents are cacti. Other prominent succulent families include the Living Stones and Ice Plant family, *Aizoaceae*, the Jade plant, *Crassulaceae*, the Century plant (Agave), the Aloe group, the Milkweed complex, the Spurge (Euphorbia) group, the Moss Roses, the Geraniums. There are several families with a few species exhibiting some to an extraordinary degree of succulence that are not commonly thought of when thinking of cactus and succulents. Some of these are the Fig Tree, the Peperomia, the Orchid, the Cashew Nut, the Yam, the Cucumber, the Pineapple, Grape, Passion Flower. Even though there are many other things like potatoes, onions and daffodils that are succulent, folks calling themselves cactus and succulent collectors/enthusiasts don't feel the need or desire to collect them.

Cactus and succulents are slower growing than 'normal' plants because they put energy and resources into 'fatness' which means they have a smaller food producing surface area with respect to their mass than 'normal' plants. In comparison to each other, they range from fast to very slow growing. In general the 'leafier' the plant the faster it likely grows. In maturity, in the 'wild', they range in size from 30-60 foot trees to barely 1-2 inches. Often, cultivated plants grow faster and bigger than wild plants, at least while they are 'young', because we are 'nice' providing, in most cases less sun, less extremes of hot and cold, more water and more fertilizer than they get in the wild. But the limitation of pots slows/stops the growth of larger growing plants, — big plants need room to grow, of course — and

many cactus and succulents are capable of growing much larger than the confines of their pot permits.

There are only a few characteristics cactus and succulents almost all have in common. Among those plants that cactus and succulent enthusiasts find most collectable, these characteristics include:

1. Some part of the plant is, at least, sort of fat to store water and 'food'.
2. They should all be planted in 'well drained' mixes commonly referred to as 'cactus' soil.
3. They should only be watered when at least somewhat dryish to very dry.
4. Most need at least some direct sun to look their best. (Most dry/desert areas have sparse vegetation making most plants of such areas directly exposed to the sun which is likely little weakened by clouds. But many areas are mountainous or canyons which leave plants in shadows part of the day. And most plants are adaptable so all day full sun is not usually required.)
5. Perhaps most importantly, they have intriguing, other-worldly shapes and colors that make us say "I want it, I've got to have it", and they are not 'claimed' by some other group of collectors such as Orchid clubs.

Growing cactus and succulents – An Overview

Knowledge of the native climate, terrain, and habitat where your plant comes from can provide clues for how to better grow it. This information is then combined with knowledge of local conditions of where you will grow the plant.

The Chicago area is farther north in latitude (41.88° N) which means we have long, cold winters and our wintertime sun is weak compared to places like Texas and California (roughly 31.96° N and 36.77° N, respectively). We simply do NOT have bright sun from mid November to March. Plants needing 'full' sun to look their 'best' will NOT look their 'best' if growing through the 'dark of our winter'. They will 'adapt' to this weak light/sun by changing colors and shapes, much like a fading summertime sun tan. The best solutions to this loss of light are to stop their growth as much as possible thru the 'dark of the winter' by keeping them as dry as possible, and give those plants that won't go into 'dormancy' (stop growing) as much of our weak sun as possible and/or strong artificial lighting.

If you like your results, then keep on doing what you are doing. Beauty is, after all, in the eye of the beholder.

Water

It is often bandied about to 'Water when it rains in Arizona'. If your plant comes from a part of the world with a climate like Arizona then this may be a good idea. But only a part of the world compares favorably with Arizona. Potted plants in the Chicago area are unlikely to thrive with 'Arizona' care.

All plants, including cacti and succulents need water to grow. But light/sun is probably single biggest factor affecting what that growth looks like. Plants, including

cacti and succulents, adapt to their conditions, changing shapes and colors with changes in light/sun, as well as water and temperature and soil and air movement/wind etc. It has been observed that a group of people given 'identical' starts of a plant to grow as they see fit will likely have a wide range of results, when compared at a later date, because of the almost infinite range of variables affecting the growth.

The most common problem, for this group, is TOO much water. Most of these plants are adapted to surviving periods of dryness and do not tolerate 'too much' wetness which kills their roots leading to collapse and death of the rest of the plant. Unfortunately, usually the answer as to what IS 'too much' wetness is found in hindsight.

Most of the 'rules' you may have heard for growing cacti and succulents are directed towards trying to avoid too much water;

1. Don't water unless the plant is dry. Therefore the really meaningful question is ***how dry is dry and how long should it stay dry***. Unfortunately only advice, research and experience can give clues to answers.
2. Use 'Cactus soil' to pot/repot cactus and succulents. 'Cactus soils' should be coarse and gritty to hold less water than 'potting soil' and therefore dry out faster than 'potting soil'. Unfortunately there is no good, readily available, well known commercial mix available in well known stores. To get good cactus soil one must seek out specialty suppliers or make it oneself.
3. Do not water immediately after potting/repotting. Wait a few days to a week or more before watering. Keep watering light until the plant is well established. Once well established water by 'drench & dry' during the growing season.
4. Only use slightly larger pots when repotting. (More soil holds more water. A slightly bigger pot only holds a little more soil and therefore only a little more water.)

Most cacti and succulents are either long lived 'perennials', and/or can be 'indefinitely rejuvenated' through vegetative propagation of cuttings. On the other hand, they can be killed almost over night and usually this can be traced to TOO much water from 'yesterday' to months earlier (It can take a long time to realize the 'death' of a cactus/succulent.)

Growth and Dormancy

Most plants around the world are adapted to seasons and succulents are no exception. Besides hot/warm summer and cold/cool winter seasons much of the world also has rainy seasons and dry seasons. So this leads to combinations of rainy summers and dry winters and dry summers with rainy winters to which plants may be to some degree adapted. In simple terms this means some plants 'expect' rain/water in summer and dry in winter and some vice versa. Thus we have plants known as 'summer growers' such as we expect here in Chicago, and plants known as 'winter growers' from areas with hot, dry summers and mild winters.

Strongly adapted plants may be injured/killed by watering in the 'wrong' season. Such plants are often thought of as difficult – easily killed. And, of course, many areas of the world get their precipitation more or less uniformly throughout the year as we do here in Illinois and plants from these regions can be thought of as 'opportunistic', i.e. willing to use water and grow whenever they get it. Such plants are therefore considered 'easy' to maintain.

'Summer' growing plants can be watered rather freely by drench and dry from spring thru summer and into autumn. Most such plants can be safely put outdoors thru these seasons provided temperatures are likely safe for the species. These plants need to be kept dry to bone dry thru their expected winter dry season/dormancy.

'Winter' growing plants are dormant and need to be kept dry to bone dry thru the heat of the summer generally late June thru mid-September though some go to 'sleep' (dormant) sooner. These plants should not be put outdoors into summer rains. Most of these plants start growing around mid-September and through the winter and spring until it gets hot in late spring to early summer. They can be watered drench and dry until they show signs of slowed growth and/or leaf loss as hot weather comes. However, because our Chicago sun is so weak in the winter, full sun winter growers should also be kept dry thru the dark of the winter, i.e. watered mostly spring and autumn.

'Opportunistic' plants can be watered whenever they are dry keeping in mind whether the light/sun is adequate for satisfactory growth.

If you want a plant to grow slowly, if at all, then keep it in as small a pot as reasonable and water and fertilize it as little as possible to keep it looking satisfactory.

If you want to encourage growth then water heavily when dryish (drench and dry) during the growing season assuming there is adequate light/sun for satisfactory growth. Keep the plant up-potted (generous pot size) to give it room to grow, and fertilize occasionally during the growing season.

Any fertilizer is fine—just use it less often and less strong than the recommendations for 'normal' plants like petunias because, by comparison, succulents are slower to much, much slower growing. Also, in general, use fertilizers that are low in nitrogen, which encourages green growth. Such fertilizers often are called flower or vegetable plant fertilizers.

Don't leave pots/containers sitting in standing water unless to rehydrate a severely dried out pot. But keep in mind the need to rehydrate by soaking in standing water suggests a poor 'cactus soil mix. Also, if a succulent is dehydrated (will have wrinkles on leaves or usually turgid parts will be soft), do not attempt to hydrate it all at once. Instead, water with small drinks multiple times but waiting between waterings so the plant can absorb the water. Check the plant between waterings and once the leaves seem to be firm again, resume a more spare watering schedule.

Pots/containers should have drain hole/holes. Virtually all commercial grower containers are 'riddled' with holes/openings which suggests that they are a good

idea. Many decorative/pretty pots for the home have only one hole in the bottom and may come with a plug. It is best to throw away such drain plugs away and use a saucer to catch water run off. Don't leave cactus/succulents sitting in significant water drainage in the saucer, either. Empty the saucer as soon as the pot has drained.

If the plant appears to be getting weak and thinner and leaves are getting farther apart (stretching/etoliating) this suggests it is growing without enough light/sun for strong, 'normal' growth.

A general guide is that healthy plants with a lot of color (pinks, reds, greys, whites) need sun, and often full, direct, hot sun at least part of the day to keep their color. Such colors are usually adaptations to help the plant tolerate full, hot sun in the wild.

Tall growing plants generally need full sun, and often full direct sun to grow strong.

More shade tolerant species generally range in size from short to very short and often grow in the shade of taller plants. Usually they have colors in shades of green, though mottled/patterned leaves are common.

Temperature

Cactus and succulents are found in most parts of the world, from Canada to Argentina and Chile, from Australia to Korea, just about everywhere but the coldest parts of the world. So there are tropical succulents (plants that don't like to spend much time below 50°F), temperate succulents (plants that like temps down in the 40s, 30s, some even tolerating some light to heavy frost), and winter hardy succulents that can tolerate considerable freezing, even down to our minus 20°F or less.

True 'desert' conditions include lots of sun, few clouds and clear dry air. So they typically warm up dramatically in daytime and cool markedly overnight. Try placing such plants right on a south or west window sill through the winter (but move the plants if a typical Chicago cold snap threatens actual freezing on the window sill).

Most full sun plants will do fine with direct sun for only part of the day. (In the wild many grow in mountainous, or canyon lands which keep them in shadows part of the day)

Morning sun is better for many more temperate species because it is not as hot as afternoon sun.

Most thin-leaved (think willow tree leaf shaped, for example) succulents are hot weather, usually tropical, plants expecting rather plentiful water in summer, and dry thru the winter when most either possibly or must defoliate into complete dormancy. Such dormant plants are fine so long as the stem from the soil is firm/turgid and will start to grow again sometime in spring to early summer. Providing extra heat and a little water can encourage growth to resume, but generally you do not want to encourage growth till the sun is again very strong or, better yet, in most cases, it is warm enough to put them outdoors in direct sun. Thin leaved succulents, when fully leafed out, can 'drink' water through the heat of the summer, and grow quite rapidly.

Summer rains are generally not a problem to thin leaved succulents, and they can be watered and fertilized (weak strength) whenever dryish.

Transplanting and soil considerations

My mixes have evolved considerably over the years reflecting mostly the different ingredients available to work with. Some general guidelines to a good mix:

- A good mix should be dryish to dry within a week or so after watering.
- A good mix should not shrink away from the side of the pot when dry to very dry.
- A good mix should provide substantial support for top-heavy plants to reduce leaning and falling over.
- A good mix should take water quickly and uniformly from top to bottom of the pot.
- A good mix should have some water draining out of the bottom of the pot with 1-2 floodings of the top.
- A good mix should have good air penetration. (In the wild many sorts of critters are burrowing and tunneling and 'aerating' the soil and/or are very rocky, porous.)

Most mixes should have a base of humus, compost, coir, potting soil type components making up to at most ~50% (for 'easier'/less challenging plants) to 10% or less (for 'difficult'/sensitive plants) of the completed mix. (A possible source of this could be a quality potting soil such as 'Miracle Grow' potting soil.) The remaining 50-90% of the mix should be coarse, gritty inorganic material such as perlite, charcoal, pea gravel, torpedo sand, crushed granite, chicken grit, aquarium gravels, fired clay products, lava rock, pumice, etc. Logic would suggest that a more complex mix is better than a 2-3 ingredient mix. Avoid very fine stuff like beach sand and use very little, if any, chemically active ingredients like crushed limestone. It is probably best not to add fertilizer to the mix because cactus and succulents are slower growing and therefore need less. Rather it is probably best to use a water soluble fertilizer at a weak strength occasionally during the growing season.

Your mix should be dryish to dry before using it. If it is wet, dry it out before using (dry to moist for 'easy' active growing plants to very dry for difficult plants, especially if dormant.) Keep your mix, well blended (coarse particles tend to separate and roll off the pile.)

Use clean pots. Scrub/scrape encrustations off used pots. (Encrustations are largely chemical deposits from fertilizers, soil leaching, water evaporation deposits.)

When transplanting it is better to gently remove as much of the old mix from the rootball as practical/possible. This is more important if the old soil is very different and more water retentive than the mix you are using. (A core of water retentive soil in an otherwise free draining mix can lead to root rot.)

In general tall growing plants can be transplanted deeper, especially rooted cuttings of tall plants.

Firm the soil well, leaving 1/4 to 1/2 inch 'head' space. A coarse mix will not settle much. Do not water immediately after potting/repotting. Wait a few days to a week or so before starting to water. Keep watering lighter till you feel plant is getting well established. Too much water too soon after planting/transplanting can lead to root rot. When well established, an actively growing plant can be watered heavily (drenched.)

Probably the best time to transplant/repot is at the beginning or early in the growing season. Be much more careful with dormant plants. In either case, try not to damage delicate roots.

When you have a mix/mixes you like, it is probably best to repot any new acquisitions into your own mix rather than leaving it in whatever medium they came in since you know your own mix better than any other from a random grower.

Given the huge range of plants falling into 'cactus and succulents' group, there is NO single mix that is satisfactory for all. Desert type plants can generally all use the same 'cactus' mix especially with adjustment to coarser for more difficult and/or outdoor use. Epiphytic (growing on trees) types need a loose, airy, soilless mix such as one might use for orchids, or ferns.

In general, one should use a very coarse, well drained mix for plants that are to spend time outdoors to better cope with heavy summer rains.

Some plants spread and are low growing, eventually covering the entire surface of the pot. Over time, they may appear to have problems and decline in vigor. Three reasons for 'sudden' difficulties with plants that have grown so well as to completely cover their pot:

1. They have 'maxed' out their growing conditions and so they slow down. Slower growth means they are using less water than when they were growing more rapidly.
2. Once a plant covers the pot it becomes its own 'mulch' reducing air circulation and shading the soil such that the sun doesn't reach the soil to warm it. These two factors mean the plant is not drying out as quickly or completely as it used to.
3. It is more difficult for you to determine if the plant is dry since you can't easily see or feel the soil. You can judge the weight of pots/containers small enough to lift (dry is lighter than wet.) You can use a toothpick or a chopstick, as when testing a cake, to pierce the soil to check moisture levels.

Much care should be taken when watering plants that cover their pot. Eventually the plant should be transplanted to a broader pot to provide additional room to grow, or divide the plant if it is a 'ground-cover' type plant that can be divided (has a root ball mass instead of a tap root.)

Dish gardens and terrariums

It is better to use open containers rather than enclosed terrariums for succulent terrariums. Even though most cactus and succulents need a lot of sun, enclosed

containers in the sun are likely to get too hot even for cacti. Such containers also lack good air circulation, which is also important as most desert areas are windy and helps the soil to dry out.

Keep in mind that faster growing plants in any combination planting are likely to take over and smother slower growing plants to some degree. It is better to use plants with similar growing seasons and cultural desires together. For example, plant cactus with cactus, living stones with living stones, leafy succulents with leafy succulents. Faster growing plants will outgrow the garden more quickly, perhaps in one season or two, and start to look messy whereas slower growing combos could look good for 5 years and longer.

Keep in mind that even fancy dishes should have drainage holes or require very careful watering.

Top dressing with sands, gravels, and/or stones can be very attractive and natural looking but remember that such materials act as a mulch lengthening drying time, and making it more difficult to ensure the pot is drying out between waterings. But most notable growers use them and almost all 'show' plants at distinguished shows are top dressed. Most big commercial growers do not top dress plants, probably because they are troublesome and expensive for mass production and transportation considerations.

Pests and bugs

Mealy bugs are the most common pest on cactus and succulents, capable of attacking almost all kinds of succulents and generally preferring young, tender growing tips and undersides of leaves. Infestations appear as whitish, cottony, unsightly masses that can cause irregular growth, and areas of blackish mold which grows on the sticky, sugary exudations from these and other insects such as aphids. Insects endemic to cacti and succulents also include scale, root mealy and mites. An infested plant should be quarantined from the rest of the collection and treated according to the type of infestation. In most cases removing the pests using q-tips and alcohol is very effective.

Propagation

By Seed

Most cactus and succulents are flowering plants that can produce seeds under the right conditions. Many cactus and succulents can only be propagated by seed. Techniques for growing from seed is much like growing any other group of plants from seed.

Vegetative Propagation

Any plant, including cacti and succulents, with obvious stems, can be cut and trimmed and shaped to some degree, perhaps even 'bonsaied'. Many cactus and succulents can be propagated by rooting those stem cuttings. Succulent cuttings

should 'dry' (callous over) in a well-ventilated, partial sun situation for a few days to weeks before trying to root them by 'sticking' them into dryish media such as coarse sand, perlite, cactus soil, etc. Soil that is too wet too soon will likely lead to rot.

Hot weather summer growers may be encouraged with extra bottom heat (usually from a growing mat) to 80-90°F. Generally, cuttings will root best during the growing season of the species. If you find you can root something easily in one season but not another, that indicates when it's growing season is.

Several can be grown from leaves which can sprout plantlets that can be planted and grown much like seeds. Usually the leaf should be carefully removed right next to the plant stem (the idea is to remove the axillary bud with the leaf stem). Leaves that come off 'easily' are likely to sprout plantlets abundantly. Removed leaves should be left in an open, airy, bright, dry situation until little roots or shoots are observed and then they can be carefully planted.

Tissue Culture Propagation

Tissue culture is a relatively new method of starting plants from a few cells grown in sterile laboratory conditions in special solutions of hormones and substances like agar. This is a rather expensive process that can make plants available in volume much more quickly than the above methods. It has become commonplace in recent years, but is not practical for the average grower.

Further website info:

In general one can find a great deal of info on most plants on the internet by searching the name of the plant. Naturally this is best done with an accurate name which can be difficult to come by.

Some recommended sites for reference:

<http://www.desert-tropicals.com>

<http://www.cactus-art.biz>

<http://www.mesagarden.com>

<http://www.cactusplaza.com>

About Bill: I've been a driving force of the cactus and succulent offerings of Ted's Greenhouse, 16930 S 84th Avenue, Tinley Park, IL since the mid 1980s. I can be contacted for questions about cactus and succulents most afternoons at the greenhouse 708 532 3575, or by email: mokenawilly@gmail.com
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