A WORD OR TWO ABOUT GARDENING

Container Gardening with Succulent 'Fat' Plants.

A previous article served as an introduction to outdoor container gardening of succulents in Miami-Dade. There are many other succulents apart from cacti from which to choose, and it is these with which this article will be concerned. First however there are a few more items relating to care and cultivation, left over from the last article, which need to be addressed. Previously reviewed were factors to consider when choosing a container and making up a soil mix. An over riding concern in both instances was creating conditions that would prevent soil from remaining excessively wet. This is especially important in Miami-Dade because year round temperatures are conducive to growing succulents permanently outdoors, which means exposure to the summer rainy season.

While it is imperative to avoid soil remaining overly moist that does not mean succulents never need to be watered. Outside the rainy season there are periods, especially during late spring when it is sufficiently hot and dry that supplemental water will be required on a weekly basis, possibly more often for a small container that dries out rapidly. During winter, even though it is dry, temperatures will have moderated and as a consequence water loss is not as rapid. In addition many succulents become dormant (or near dormant) at this time further reducing the need for water. Even so it is important not to allow the soil mix to dry out too much as this can cause roots to die back, resulting in a delay of renewed active growth until lost roots are replaced. If the loss is extensive the entire root system is liable to rot. As a simple check gently try to rock the stem; if it feels loose this indicates a loss of roots and if excessive a probable basal rot of the stem.

Some experienced succulent growers claim to be able to judge the need for water based on how heavy the container feels. For a large container (or non-porous type) it is better to invest $50 – 100 in a greenhouse soil moisture meter. These can be calibrated quite simply for any soil mix and on inserting the probe give a relative reading of soil moisture. For a meter with 0 – 10 scale, water once it registers between 0 – 2 (i.e., soil 80 – 90% 'dry').

Be careful when watering succulents that are native to regions with Mediterranean type climates (mild wet winters, hot dry summers). To varying degrees they tend to enter dormancy during summer, with active growth in winter (if very cool growth will cease and be more in evidence during fall and early spring). Depending on the extent of summer dormancy such succulents (e.g., many crassulas, aeoniums and some aloes) often do not thrive locally outdoors at this time, coinciding as it does with our rainy season. This is especially so where the stimulus for active growth is closely tied to decreasing day length, i.e. the months after mid-summer. Where such succulents are grown indoors, gradually reduce water starting in late spring and resume a normal schedule again as days lengthen after August.

Equally important as preventing excess soil moisture is **correct light exposure**. Although there are some exceptions, most succulents succeed best when grown outdoors, with at least full morning sun. However there are some species that are

satisfactory grown in small pots on a windowsill or near a south or east facing window that provides bright light – artificial light is a poor substitute. For instance succulents suited to **indoor cultivation** include **gasterias** and **haworthias** (both closely related to aloes). Gasterias can withstand relatively low light levels, while haworthias, which are much smaller, appreciate bright light and warm rather than hot temperatures. Similar conditions suit **echeverias** ('hens and chickens') which grow in dry, partly shady, comparatively cool mountainous areas of Mexico and Central America. ***Lithops*** (fascinating, stemless succulents that resemble multi-patterned pebbles – 'living stones') can also be grown on a sunny windowsill, though over time they will become 'stretched' if sunlight is inadequate. Locally, all of these above species are best grown indoors, being unable to survive intense summer rains.

With respect to light exposure outdoors, locally grown container succulents need full sun exposure, at least from late spring to early fall. This is to ensure the rapid evaporation of excess soil moisture, the result of frequent heavy afternoon storms during our rainy season. Some succulents prefer shade (see below) and where full hot sun is expected with no appreciable rainfall these should be moved into lightly dappled shade or receive only full morning sun. Succulents susceptible to excessive sun often develop red to brownish pigmentation (some aloes and stapeliads), a sign that additional shade is necessary.

The remainder of this article will be devoted to **caudiciform** and **pachycaulous succulents**, sometimes referred to as **'fat plants'**. No, the nick name does not signify plants that are in need of a crash diet; it is water storage that makes them obese not a vegetable equivalent of lard. In its strictest sense the term caudiciform refers to plants where the base of the stem, and extending into the root crown, is grossly swollen to form a caudex. Often this is broadened to include any plant with a swollen trunk. The term pachycaulous is preferred by some to describe the latter, where trunk and often stems are swollen but there is no additional enlargement of the trunk base or root to form a caudex. Where the caudex is mostly below ground, it is often exposed ('raised') so that growers can display its' architectural features and surface texture. 'Fat plants' range from dwarf succulents such as the baseball plant (*Euphorbia obesa*) to large pachycaulous trees such as the familiar baobob (*Adansonia digitata*). The latter is among a number of pachycaulous trees and shrubs amenable to bonsai cultivation.

Probably the most familiar caudiciform found in local landscapes is the ponytail tree (*Beaucarnea recurvata*), while the gumbo limbo (*Bursera simaruba*) can be described as being somewhat pachycaulous. Several *Bursera* spp. from Mexico (ie. *B. fagaroides* and *B. odorata*) make excellent pachycaulous trees for bonsai presentation. Incidentally the latter of these two trees is commonly referred to as Mayan incense – the related species *Boswellia sacra* and *Commiphora habessinica* (both in the Burseraceae) are the sources of frankincense and myrrh respectively. Neither of these two trees is readily available; however other species of Boswellia and Commiphora are sometimes offered by specialist growers and are easier to grow.

For the sake of brevity the term caudiciform will be used when referring to 'fat plants' though in some instances there is a gradation/transition from hidden enlarged

rootstock to exposed caudex to swollen trunk/branches. Two of the most popular container caudiciforms, **adeniums** (**desert rose**) and **pachypodiums**, illustrate this latter point. Both are members of the Apocynaceae (frangipani family), with adeniums distributed in the drier parts of Africa (especially E. Africa) and Arabia and pachypodiums mostly in Madagascar with a few species in southern Africa. Desert rose is frequently seen for sale in local garden centers and is appreciated as much for its stunning display of flowers as for its unusual form. There is confusion over naming: some authorities consider the genus to contain a single species (*Adenium obesum*) and several sub species, others have raised subspecies to full species and established several varieties. For this article we adopt the former approach.

Most of the specimens offered for sale are ***A. obesum* subsp**. ***obesum*** and have been grown from stem cuttings; they develop into highly floriferous pachycaulous shrubs but the caudex never attains the size of plants grown from seed. For aficionados of fat plants, willing to settle for a somewhat less showy flower display, ***A. obesum* f. 'Shada'** is the selection of choice with its' impressive broad squat caudex Other subspecies of ***A. obesum*** are sometimes available from specialist growers: **subsp. *boehmianum*** has large (up to 5") thick leaves, while **subsp. *oleifolium*** has very narrow (½") 4"leaves. Both have less well developed caudices and long rather spindly stems. The rarely seen **subsp. *somalense*** develops an enormous conical caudex to 6' (in the wild) with a crown of numerous thin stems, whereas **subsp. *swazicum*** is more shrub-like with most of the caudex below ground.

Adeniums flowers range from palest pink (almost white) to rosy red; however there are an ever increasing number of cultivars available with flowers ranging from pure white (**'Snowbell'**) to dark red (**'Black Ruby'**). Thai growers have produced a large number of hybrids with multi-colored flowers, and a few selection with double flowers are beginning to become available (e.g., *A. obesum* subsp. *swazicum* 'Double Delight')

Pachypodiums are of more diverse form than adeniums ranging from the pachycaulous tree like ***Pachypodium lamerei*** and ***P. geayi*** (known misleadingly as **Madagacascar palms**) to the caudiciform ***P. succulentum*** and ***P. bispinosum***. Unlike adeniums all pachypodiums are armed with spines. *Pachypodium lamerei* is very occasionally found in local landscapes where it can attain a height of 12-15'. As container plants, while increasing in popularity, pachypodiums are no where near as popular as adeniums. This may in part be due to most species being slower to commence flowering – *P. lamerei* first flowers at a height of 3-4' after which it also first branches (≈ 3-4 years for a 3 gallon specimen). Flowering is well worth waiting for, each 3-4" flower having a tubular corolla with 5, broad, pure white lobes (petals) and a yellow throat. The trunk is covered with 1" needle like spines set in groups of three with a terminal rosette of glossy, dark green, linear leaves each more than 10" long. There are several yellow flowering species (all small, low growing pachycaulous shrubs with conical to bottle shaped stems) that are ideal as container plants, flowering much sooner than the larger tree-like species. These include ***P. rosulatum*** complex, with pale yellow, salverform flowers; ***P. densiflorum*** with dense clusters of smaller, deeper yellow, flowers, and ***P. horembse*** with deep yellow cup-shaped flowers.

My own favorite pachypodium for containers is ***P. baronii.*** There are two varieties, both with red flowers: **var. *baronii*** has 8", extremely handsome, dark green, glossy leaves and in summer clusters of 2" bright red flowers, each with a small but prominent white eye, held aloft on a forking ≈4" peduncle. The stem is flask shaped tapering to a few thinner branches, covered in conical spines, and growing to 6' in the wild. The other subspecies (**var. *windsorii***) is smaller with a distinctly globose stem base and smaller flowers on shorter peduncles.

Compared to other succulents adeniums and especially pachypodiums are quite fast growing, responding well to summer rainfall and an application of slow release fertilizer. Both adeniums and pachypodiums are to varying degrees at least part dormant during winter. Under Miami-Dade conditions as long as the plant retains most of its' leaves (e.g., *P. lamerei*) and temperatures at night remain above 65ºF, continue to water. When night temperatures are lower or leaf drop is complete (e.g., *P. baronii baronii*) reduce the frequency of watering so that the soil is just moist enough to prevent loss of roots. Adeniums can suffer from scale insects (especially late fall), aphids (on flower buds) and red mites (a particular problem on f. 'Shada') and occasionally oleander caterpillars.

Uncarinas are a group of mostly pachycaulous (some form a subterranean caudex) succulents in the sesame family (Pedaliaceae). They thrive under conditions similar to those for adeniums (plenty of water during summer, followed by warm dry winters). Like adeniums they respond well to fertilizer when in active growth and all have showy, if somewhat short-lived flowers. The two most commonly available species, ***Uncarina grandidieri*** and ***U. roeosiliana*** both have trumpet shaped yellow flowers, the former with a deep maroon throat, and flared petals. Leaves are cordate and lobed (more so in *U. roesiliana*) with the surface covered in velvety hairs. The latter species forms a globose caudex (often raised) while the former has the most attractive form, developing an impressive stout trunk. *Uncarina grandidieri* can eventually develop into an 8-10' small tree (locally), and makes an attractive landscape shrub if placed in full sun with coarse free draining soil. There are species with other than yellow flowers e.g., ***U. abbreviata*** has striking, reddish mauve, petunia-like flowers.

In hot sun container grown uncarinas are at risk of wilting if the soil is allowed to become too dry; this is especially so for *U. abbreviata*. This latter species also becomes dormant, loosing all of its leaves in late fall; at this time water infrequently - enough to prevent roots from drying out. With renewed growth in April-May resume regular watering. Both of the yellow-flowered species retain some leaves throughout our locally warm winters – avoid watering once night time temperatures fall below 60ºF. Related to uncarinas (also in the Pedaliaceaea), ***Sesamothamnus* spp.** develop into deciduous, caudiciform shrubs or small trees, often with peeling bark, and upright stems covered in thorns and clusters of small obovate leaves. Flowers are large, usually fragrant, tubular with spreading petals and appear when the plant is leafless. Most frequently seen in cultivation, ***S. lugardii*** **(Transvaal sesame bush**) can develop a 6' caudex in the wild and produces showy white flowers; it is grown both as a bonsai and occasionally as a landscape item in

Southern California (it less prone to rot than uncarinas and like them thrives on calacareous soils so should be worth trying locally).

The caudiciforms discussed so far although unusual in overall appearance, possess flowers that while exceptionally showy, are what might be termed "conventional". **Dorstenias**, members of the fig family (Moreaceae), possess out-of-this-world "flowers" that would not look out of place on a Savador Dali canvas. The succulent dorstenias are found mostly in NE Africa and parts of the Arabian peninsular with the two most popular pachycaulous species being ***Dorstenia foetida*** and ***D.gigas***. The former is a sub-shrub (to ≈8") of highly variable appearance and probably includes several sub species or varieties, but has been insufficiently studied. Stems are green to reddish brown, swollen (base may also be somewhat globose), with prominent leaf scars and peeling periderm (skin) near the base. Leaves are narrowly lanceolate to elliptic, non-succulent (but thin and papery), loosely whorled toward branch tips. Borne on 1½" stems, those weird, solitary, pale green "flowers" are in fact an inflorescence. Each consists of a spongy saucer-shaped pad (a specialized receptacle known as the hypanthodium), the face of which is covered with numerous tiny flowers. Around the margins of the receptacle are ≈ 10 thin tentacle-like projections. The appearance of the inflorescence has been likened to an exploded fig; not surprising for the related fig is itself a closed fleshy receptacle containing hundreds of minute flowers.

Dorstenia gigas is a much larger species, potentially growing slowly up to more than 8', but highly regarded as a succulent bonsai. From a smooth broad squat trunk arise many branches with leaf scars which give the surface an almost reptilian appearance. Clustered toward the stem tips are bright green leaves, smaller and shinier than those of D. foetida. Flowers are only seen on mature specimens.

Dorstenias appreciate some light shade (particularly *D. foetida*); direct hot sun causes leaves to discolor and drop. They do however require heat, so although they can be grown indoors growth is better outside. During late spring through summer they also respond to water and an application of slow release fertilizer - if it does not rain, water every 3-4 days. Reduce the frequency of watering during winter; at this time they become at least semi-dormant and will loose some or all of their leaves. Although dorstenias may rot from excessive watering during winter (every 7 – 10 days should suffice), the greatest risk is water applied when much of the root system has been lost because the soil has been allowed to remain excessively dry.

For many of those addicted to collecting 'fat plants' it is not the floral display, foliage or any of the wholly above ground parts of the plant that fascinate, but simply the size, color and surface texture of the caudex. Two of the most popular succulents in this respect, and easiest to grow, are **fockeas** and **adenias**. Like many true caudiciforms they both posses thin often sprawling or vining stems, and insignificant flowers. ***Fockea*** is a small genus (Apocynaceae) from southern Africa with sparsely leafy stems and sweetly scented though otherwise inconspicuous flowers. They can develop an enormous columnar to napiform (globular, tapering toward base) caudex, 1-2' across to 3' in length, most of which is below ground. Initially they should be grown in a deeper than usual container, then after 2-3 years transplanted to a shallower wider container when the caudex is exposed ('raised').

Although fockeas can accept full sun, once raised the caudex needs to be protected from direct sun (use a skirt of shade cloth if necessary). If you are new to fat plants try ***F. edulis*** which is usually readily available and eventually develops an attractive warty caudex. From southern Angola comes ***F. multiflora*** which not only has a large caudex but in the wild grows as a liane, the more 6" thick vining stems giving rise its' popular name of vegetable python. This species has been reported to be less susceptible to rot and has been grown successfully in the humid climates ofboth Florida and Hawaii.

Adenias are members of the passion flower family (Passifloraceae) and make up for their insignificant flowers with huge, globose to flask shaped caudices, (can be up to 6' across in the wild). From the caudex arise stems that like passion vines often have palmately lobed leaves and climb using tendrils; some species have more upright stems and bear spines or thorns. ***Adenia glauca*** is of the latter type with stems arising from a somewhat warty dull green caudex and it has been reported as being especially well suited to cultivation in Florida. Somewhat more attractive, ***A. glauca*** has a smoother caudex, the base a silvery grey the top olive green, and thin vining stems. As above for fockeas, the caudex should be protected from direct sun. For both adenias and fockeas use a gritty soil and provide an application of slow release fertilizer at the start of the rainy season. Reduce the frequency of watering as they enter dormancy during winter (more so if there is complete loss of leaves, though some are usually retained under local conditions).

A word of caution, adenias are highly poisonous. Indeed this is true of many caudiciform succulents, including dorstenias and adeniums. As far as small children are concerned they warrant a 'Mr Yuck' warning. For those who decide to grow them be prepared to become a victim of the odd fascination and beauty of these 'fat' plants.

John McLaughlin November 26, 2007

***Uncarina abbreviata* with flowers**