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Master Gardener Journal

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Maricopa County Master Gardeners: Cultivating Plants, People & Communities since 1980 Master Gardener volunteers are trained by University of Arizona faculty and staff during a 17-week course. They provide educational leadership to the community with research-based horticulture knowledge. Volunteers promote efficient use of water, fertilizers, and pesticides, and preservation of our desert environment.

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Cover Photos: (clockwise from top left) Container, Jo Cook; Perfect Tree, Kim Garden; Yerba Mansa, Janice Austin; front yard, Jo Cook.

Lucy Bradley, Extension Agent, Urban Horticulture
May 2005

5/7 8:30 a.m. Weekend Birdwalk
Final guided bird walk of the spring. Departs from the visitor center lobby. Boyce Thompson Arboretum (520) 689-2723 arboretum.ag.arizona.edu

5/7 9:00 a.m. – 12:00 p.m.
Designing Water Features
Water: its varied sounds, visual beauty and refreshing feel are just some considerations when selecting a water feature for your garden. Carrie Nimmer, landscape designer. Desert Botanical Gardens (480) 941-1225 www.dbg.org

5/13 10:30 a.m.
Cactus Flower Tours
Boyce Thompson Arboretum
Learn to differentiate an Opuntia from an Echinocereus as you view the variety of colorful cactus. (520) 689-2723 arboretum.ag.arizona.edu

5/17 9:00 a.m. Master Gardener Application Workshop
Via Linda Senior Center
Learn how to become a Master Gardener Volunteer. Deadline for applications for the next class is May 24, 2005.

5/17 6:30 to 8:30 pm
Native Habitat Gardening
Judy Mielke, Landscape Architect. Draw inspiration from natural groups you see in the desert and how natural plants serve as valuable resources for native wildlife. City of Glendale www.glendaleaz.com/WaterConservation/Landscap classes.cfm

5/22 10:30 a.m. Edible & Medicinal Plants Walk
Curandero Trail and learn about edible and medicinal plants of the Sonoran Desert. Boyce Thompson Arboretum (520) 689-2723 arboretum.ag.arizona.edu

5/24 6:00 p.m. – 9:00 p.m.
Landscaping for Small Places
Garden horticulturist Kirti Mathura will help you create a beautiful landscape with interesting, yet appropriate plants for those small spaces. Desert Botanical Garden (480) 941-1225 www.dbg.org

5/28 10:30 a.m. Butterfly Walk
See dozens of colorful butterflies on this tour guided by Education Coordinator Chris Kline. Boyce Thompson Arboretum (520) 689-2723 http://arboretum.ag.arizona.edu/events/butterflywalk.html

Continued on next page
June 2005

6/4 8:30 a.m. - 11 a.m.
Learn Your Lizards Walk –
Regular Adult Admission $7.50
Observe lizard behavior and
learn about Sonoran desert
adaptations guided by Arizona
Game & Fish Biologist Daren
Riedle. Boyce Thompson
Arboretum (520) 689-2723
For more information:
http://arboretum.ag.arizona.edu/ events/lizardwalk.html

6/8 6:30 p.m. - 8:30 p.m.
Learn How to Set Your Irrigation
Timer Correctly
If knowing how to water your
plants is a mystery to you….
Learn easy to follow steps to
determine the amount and
frequency of water needed for
your landscape. Free. Glendale
Main Library, 5959 W. Brown
St., Glendale, AZ Free. To
Register contact: Julie Phillips:
Jphillips@GLENDALEAZ.com
(623) 930-3760

6/25 10:30 a.m.
Butterfly Walk
See dozens of colorful butterflies
on this tour guided by BTA
Education Coordinator Chris
Kline. Boyce Thompson
Arboretum (520) 689-2723
For more information:
http://arboretum.ag.arizona.edu/ events/butterflywalk.html

6/25 1:00 p.m.
Scorpions of the
Superstitions – Boyce Thompson
Arboretum (520) 689-2723
arboretum.ag.arizona.edu Guest
speaker: Andy Baldwin
Regular Adult Admission $7.50
Plus Lecture fee: $5 nonmember,
$3 member

Illustrations by Chris Jagmin.
Summer Smarts for Landscapes —

Protect your valuable landscape investment against the scorching sun

by Kathleen Moore, City of Chandler Water Conservation

As temperatures begin to rise into the triple digits, people tend to seek refuge in air-conditioned buildings. Plants, firmly rooted in the soil, must tough out the scalding heat and damaging UV rays. While it is common to see landscapes stressed in the summer months, there are some easy steps you can take to keep your property healthy and inviting all year long.

Make sure your plants have an adequate supply of water, but not too much. With our copious rains this winter, many trees and shrubs received the long slow irrigation they desire. As our clay soil can hold onto moisture for a very long time it is wise to wait until the soil feels dry to the touch before turning your irrigation system back on.

While you are waiting for your soil to dry out, it is a good time to do an irrigation system check up. Check that your timer is in working order, make sure all your drip emitters are firmly in place, look for broken sprinkler heads, check for any leaks and plug up any drip lines that are watering a plant that no longer exists.

To make sure your plants are receiving the correct amount of water, it helps to take an inventory of the plants on your property. To help you identify some of your plants and their water needs, order a free copy of Landscape Plants from the Arizona Desert by contacting your local water conservation office.

This full-color brochure contains information and photographs of over 200 low water use plants.

For established plants, watering depends on their type. Non-desert varieties like ash, ficus, and privet will need a deep watering once each week during the summer months. Native and desert-adapted varieties such as mesquite, acacia, and oleander can almost survive on their own with occasional deep soaking once a month. If we have a wet monsoon season, watering on all types of established trees and shrubs can be greatly reduced.

It is always best to plant in the fall, but if you are replacing any plants this spring they will need daily watering for the first few weeks, or until the monsoon rains arrive. As a general rule of thumb, once desert adapted plants have made it through the first summer, you can cut back on the water dramatically. For higher water use plants, you will still want to cut back the water once established, but not as severely. Call your local water conservation office and ask for your free copy of Landscape Watering by the Numbers, which will walk you step-by-step through programming your irrigation controller based on plant types.

It is wise to avoid pruning plants during the summer months. Minor pruning on native trees such as palo verdes, ironwoods, mesquites and acacias can be done in May, but as a general rule, it is best to leave pruning until the fall. Leaves from the canopy of a plant shade inner branches; removing leafy growth will expose stems to the scorching sun. Some plants can suffer from severe sunscald if over pruned. If your trees must be pruned up for safety or access, and they are sun-sensitive, consider painting their trunks with some watered-down latex paint. When-ever you prune remember to remove only 25% of the plant canopy in one growing season. Constant sheer pruning of shrubs makes them susceptible to sun scald and makes them less water efficient.

When mowing your lawn, be sure to remove only 1/3 of the blade of grass at a time. Setting the mower blade lower to the ground will not only stress the grass, it will increase its growth rate to compensate, and you will have to mow more often.

Continued on next page.
When applying fertilizers to grass do so in the morning and time an irrigation to occur soon after the application. Fertilizer that is not properly watered in can burn the grass.

Do not spray garden chemicals such as insecticides when temperatures are above 90 degrees. The combination of heat and sun can cause some of these chemicals to be toxic to plants. For insect troubles, consider a strong spray of water on the plant early in the morning. A jet of water will often knock insects like mites and aphids off the plant and they cannot climb back on. If you have no choice but to spray, do so in the early morning before the temperatures creep up.

Mulch is a great addition to any landscape. All plants benefit by having a layer of mulch on top of the soil. A two-to-three inch layer will insulate the soil from the warm air temperatures and will also help retain water in the soil. Mulches can be organic such as bark or compost or inorganic like crushed granite. Make sure you keep your mulch at least 2-3 inches away from the trunk of the plant.

Following these simple suggestions will keep your plants healthy and our landscape looking great even in the dead of summer.

Photo by Kim Garden

**Question:** I have been hearing about a pre-emergent for weeds made of corn meal. Is there such a thing and does it work?

Corn gluten meal, a by-product of the milling process used to make corn starch, is the product you have heard about. Dr. Nick Christians at Iowa State University discovered its usefulness as an herbicide in 1985. It contains enzymes that inhibit the growth of feeder roots on newly sprouted seeds. Since it only works on seedlings it can be used on established turf and gardens. In addition it contains about 10 per cent nitrogen, which makes it a slow release fertilizer as well.

Tests done at Iowa State showed the substance to be 60% to 100% effective on many common grasses and broadleaf weeds. The effectiveness increased with additional applications over a period of three or four years.

Not all test results have been so glowing, however. In California trials, the gluten did not perform as well, although it was somewhat effective. Here in Arizona, Kelly Young from the Maricopa Cooperative Extension tried an experiment with three plots. One was a surface treatment using 30lb/1000 sq. ft. The second plot had the gluten incorporated into the soil. The third was an untreated control plot. The test was done during the summer months. She found no difference in weed germination between the control and the test plots. Soil conditions and temperature may be a factor.

Corn meal gluten is sold in pellet form and, like other pre-emergent, should be spread over lawns and garden areas in early spring or early fall. The application rate is about 20 lb/1000 square feet. It needs to be watered in if there is no rain and then it requires a few days of dryness to work. It lasts about six weeks in the soil.

Iowa State owns the patents and their website lists the companies who are licensed to sell it along with brand name and contact information. (www.techtransfer.iastate.edu) Click on technology search, and then on Corn meal gluten information. The cost for CGM is considerably higher than traditional pre-emergent (about $20 for 50 lb), but some may want to experiment with it in the fall or in a turf area to see what happens. If you do let us know what your results are.

My research for this article has sparked my interest. I think I will spring for a bag of it come fall and see what happens.
How many times have you thought you had found the perfect plant for your landscape, taken the greatest care to plant it properly, lavished it with attention only to have it wither away and die? Or perhaps your plants are growing well, but your landscape just doesn’t look the way you imagined it would. It’s possible that your plants just haven’t been placed in the best possible location. Many obstacles to growing healthy plants and achieving a beautiful landscape can be avoided by proper placement of plants. The best time to determine where a plant will go is before you buy it.

At one time or another you have probably strolled through a nursery, become entranced by a beautiful plant in bloom and bought it on the spot without giving any thought as to where you are going to plant it. It can be difficult to resist purchasing a plant without giving enough consideration to the conditions it will need to flourish. Whether you are designing a new landscape or adding to your existing one, it pays to take the time to plan ahead and avoid disappointment later. We have all become familiar with certain trees, shrubs, perennials and other plants and the conditions under which they thrive in our unique desert climate. There are times, however, when we come across a plant that we are not completely familiar with. Or perhaps in our enthusiasm to spruce up our landscapes we simply neglect to take the time to research the possibilities.

Being aware of the light and water requirements of a specific plant, of course, is essential to growing a happy and healthy specimen. But there are several other factors to consider when deciding where to locate a landscape plant. Soil type, microclimates present in one’s yard, mature plant size, energy conservation concerns, and basic design elements should also be considered when deciding what to add to your landscape and exactly where to put it.

Light & Heat Conditions
Examine the patterns of light and shade in your yard, keeping in mind that the angle of the sun changes with the seasons.

Plants that demand full sun will need a minimum of six hours of sunlight per day. Those that can tolerate the extreme heat from reflected sunlight can be planted next to south or west-facing walls and fences. Remember that sidewalks, patios and other paved surfaces will also reflect light and absorb heat. The list of these plants is extensive; many native and desert-adapted species belong in one or both of these categories.

An eastern exposure will satisfy those plants that require partial sun and offer relief from the intense afternoon sun. Filtered sunlight under desert trees or an arbor type structure might also fill this need.

Plants that require a shady environment can be placed on the north side of a structure or under a tree with a dense branching habit.

Irrigation needs
Many plants, including cacti and succulents, do not appreciate “wet feet”. Roots may suffocate if drainage is inadequate. Poor drainage can contribute to over watering, so be sure to determine if a plant you are considering is fussy about drainage. Check out and test the planting area if necessary. Drainage can vary greatly throughout your yard depending on the type of soil and the slope of the ground.

Continued on next page.
If caliche is causing a problem, you will either have to find a way to break it up or resign yourself to an alternate location for your plantings.

The amount of water a plant requires can range from low water to heavy water use; locate plants close to others with similar needs. Watering chores will be simplified and the chance of plants being stressed due to improper watering will be greatly reduced.

Landscaping responsibly in our desert climate necessitates using low-water plants. With careful planning a lush-looking landscape can be achieved with native and desert-adapted plants. If you are determined to include plants with high water requirements in your yard, try to keep that area to a minimum in order to conserve water. Consider keeping these plants close to your home where you can enjoy them on a daily basis.

If you do not have an automatic irrigation system, place plants as close as possible to a source of water as to save yourself the unnecessary aggravation of constantly dragging hoses or watering cans around your yard.

**Soil Type**
Alkaline soil with high ph levels; elevated salt content and very little organic matter is a fact of life in our arid desert. Fortunately, if you choose plants that are indigenous to our region or those adapted to our soils and climate, they will do just fine in your landscape. If you choose to include some vegetation that needs acidic soil to thrive be certain to cluster them together in one area of your yard. They will not develop properly unless given special attention. Better yet, isolate them in raised beds where you can more easily tend to their specialized care.

Modifying the soil in your yard with soil amendments and fertilizers to accommodate large numbers of plants that are not adapted to our region is an option. But think hard before making that decision. How much time and expense are you willing to give to your landscape? Do you really want to constantly struggle against the climate and soil prevalent in our area?

**Microclimate**
The microclimates in your yard are specific variations in your landscape’s climate resulting from factors such as its orientation to the sun, the slope of the ground, direction of the wind, hardscape features and structures. They may differ from your neighbors’ and may even change from one corner of your yard to another. Your microclimates help determine what will and won’t thrive in your landscape. But you also have the opportunity to alter your “mini-climate” to fit your lifestyle. Think carefully about how you and your family and friends will use your outdoor space. Would more shade make your yard more livable? Plant a tree or a tall shrub!

**Plant size**
The mature size of a plant is one of the most practical considerations when choosing landscape plants. Nevertheless, we frequently do not give enough thought to this aspect of our design plan. If you don’t allow sufficient space for your plantings to grow, expect to become trapped in an endless cycle of pruning. The consequences are unhealthy plants and less time to enjoy our gardens. Also, be cautious when planting adjacent to sidewalks and patios. Choose plants of a suitable size and position them with adequate space to spread. Know how large your landscape plants are likely to grow and they will develop a natural size and form. Fill spaces between newly planted specimens temporarily with annuals, perennials or wildflowers if you are unhappy with empty spaces in your landscape.

*Continued on next page.*
Another practice likely to cause problems is placing plants too close to foundation walls and fences. Leave a minimum of twelve to eighteen inches between your home and the anticipated mature size of the specimen. Plants will receive more light and better air circulation. The chance of spreading roots growing too close and interfering with a structure will also be reduced.

Keep in mind the view of your landscape from within your house. Take into account a plant’s ultimate height when locating it under a window. Chances are you won’t want your view to the outdoors blocked unless it is an undesirable one.

**Energy Conservation**

You can conserve energy and reduce utility costs by using plants in appropriate locations. Landscape plants positioned along the east facing walls of your home will conserve energy by preventing heat from building up, as the day grows warmer. Make use of deciduous and semi-deciduous trees and tall shrubs to shade the west side of your home during the hot summer months. Sunlight will penetrate and help to warm your home throughout the cooler months when their foliage is less dense. Vines, groundcovers and other plants can help to cool the air and diminish glare on southern exposures by increasing humidity and absorbing sunlight.

**Design Elements**

The visual impact your plantings will project is essential to a successful landscape. Place your plants with bloom and foliage colors, texture and form in mind. Locate new plants where their bloom color will blend well with others. Do you want to create a lively spot in the garden or a peaceful retreat? Use color to set the tone. Be aware that warm hues of red, orange and yellow will “pop”, moving forward visually. On the other hand, cool colors, including blue and purple tend to fade into the background and will not show well in the shade or when the sun goes down. Whites and pastels will glow at dusk and captivate you and visitors to your garden during the evening hours.

Don’t just think green when looking at foliage. Gray-greens, blue-greens, yellow-greens, variegated greens and even burgundy tones can be incorporated in your landscape. Mix and match foliage colors to add interest to the landscape.

Place specimens that are coarse (rough) textured among plants that are fine (smooth) textured to provide contrast. Form is the element the eye perceives as shape. When deciding where to set your landscape plants, determine how their form will blend with others in the same vicinity. Utilize vertical and horizontal form to create and frame attractive views. Check out the growth habits of the specimens you are considering.

Mounding, spreading, angular...layer these different shapes to make your landscape flow from one area to the next. Bringing too many different shapes into play, however, can create a landscape that is visually confusing.

Finally, give some thought to your safety and comfort as you relax, play and work in your outdoor space. Thorns, pollen and excessive plant litter can spoil one’s experience in the landscape. Look into potential problems that some plants can create and plan accordingly.

Gardeners will always experiment with plants in their landscapes. Inevitably, there will be successes and failures. That is part of what makes our landscapes so interesting... endless possibilities and challenges. No landscape is perfect, but placing your plants where they will have the best chance to flourish will ultimately provide you with many years of pleasure.

Photos: Hillside, Datura, Pondscape Jo Cook; Palo Verde, Kim Garden.
Ponds In the Desert — Really?

By Barbi and Paul Holdeman, Master Gardeners

The 3rd annual Parade of Ponds was held on April 23-24. This Valley-wide self-guided garden tour centered on ponds and raised money for Water Safety/Drowning Prevention and 4-H Youth Gardening.

Those who attended were able to visit both gardens, talk with the owners about their pond or water garden experiences and get helpful information on water features and how they can enhance one’s home and lifestyle.

A well-built and organically kept pond or water garden can be the perfect addition to a natural desert environment. In addition to being cost-effective, water-efficient, and low maintenance, a pond offers an enjoyable, relaxing, and entertaining alternative to a lawn.

In order for a pond or a water garden to be energy efficient and low maintenance, there are a few key elements:

1. It should have both a skimmer and biological filtration.
2. It should also have an energy-efficient circulation system that runs 24/7 to keep the filter system working.
3. It should contain rocks and gravel in which the beneficial microorganisms can thrive. Mother Nature’s good guys will do an amazing job at helping you keep the water clear.
4. Last, but by no means least, you should include a variety of aquatic plants and fish. Yes, fish. Don’t worry, though, they don’t add to the maintenance — they’re part of why a well-designed pond will be low maintenance. They graze on the algae, insects, and dead plant material. In return they provide the fertilizer for aquatic plants within the ecosystem. This is not to say that you can’t have a healthy organic water source without some of these ingredients, but it won’t be nearly as low maintenance.

Ponds offer an added benefit: integrated pest management (IPM). Build it and they will come: toads, dragonflies, damselflies, native and migratory birds. Once the beneficial creatures move in, they’ll help control pests such as crickets, roaches or even scorpions. In fact, they’ll hunt your property clean for you — happily, and provide you with hours of amusement, to boot.

Both the dreaded West Nile Virus and the lesser publicized Equine Encephalitis seem to be on everyone’s minds these days. Legitimate concerns, these dangerous diseases are becoming more prevalent. UofA Urban Entomologist Dawn Gouge, Ph.D., agrees that a well-managed pond removes these disease-carrying mosquitoes from the community. She also agrees that a pond filled with beneficial life forms needs minimal time and effort to keep up, while providing much needed vector control.

On the other hand, poorly managed, abandoned, or uncompleted pond projects are fodder for disease-carrying insects and could ruin your next weekend barbecue. Report any such potential health hazard immediately to Maricopa County Vector Control at 602-506-0700.

For more information on ponds and water gardens, visit the Garden Gnome at www.PondGnome.com.

Check out the Center for Disease Control’s website, for more information on West Nile Virus http://www.cdc.gov/ncidod/dvbid/westnile/ or Equine Encephalitis http://www.cdc.gov/ncidod/dvbid/arboret/wefact.htm.

Photo by Janice Austin.
Hailing from the sunflower family, this cheery plant will certainly add some sunshine to your landscape. Daisy-like neon yellow flowers float above a sea of dusty gray green leaves all year round. Its mature size is quite petite at one foot tall and wide. It can be tucked in several places in your yard acting as a landscape “glue” that will hold your naturalistic desert design together. This hardy perennial is native to the southwestern US and Mexico. It tolerates full or reflected sun and needs well draining soil. In fact they will suffer from root rot and die if over watered.

They have no thorns and look great as a border plant along a walkway. Someone once said you should plant a desert marigold for every boulder, and it is true. Their fuzzy texture looks especially lovely against a rough, burnt, red rock.

I find myself admiring them in the mornings and evenings as they track the sun much like their cousins in the sunflower fields of South Dakota. They grow so quickly. You can almost see them popping out new blossoms right before your eyes.

Desert marigolds are short lived but reseed easily. If you loose a parent plant, you are sure to have several offspring appearing in other areas of the yard. Just be careful you don’t mistake the tiny seedlings for weeds and pull them out. They often emerge from the ground with three or four fluffy, gray green leaves. Once you know what you are looking for, they are easy to distinguish from their weedy cousins.

Not only do desert marigolds provide fabulous color all year round, you will find butterflies love to dance among the many blooms. They land on the delicate yellow pedestals to take a rest and sip some nectar. There is always room in any low water use landscape for desert marigold.
This book welcomes the reader to the wonderful world of “yerba buena,” or “good herb” to us English speakers. A nice mix of traditional folk healing information, blended with more recent scientific and medical research supporting the ancient uses of Latino herbal remedies.

Latino Folk Medicine starts with a very detailed and informative, but easy to read section on the background and history of New World cultures and their uses of plants for medicine, before the Spanish colonization. The second half of the book is laid out in alphabetical order by the more popular Latino name for each herb, and then lists other common names for the same plant, the Latin or scientific name, the origin or other growing areas and then details on the myriad uses of each plant in folk medicine traditions. Further details include the growth habit of the plant in case you want to include it in your garden, and details on scientific and medical research on the healing properties of this plant. Many of these will be plants that our Southwestern gardeners easily recognize from their own gardens, while others will be new and possibly worth hunting down to add to our gardens.

This book makes a very nice addition to any plant person’s shelves, and will become a useful and oft-thumbed reference volume for any gardener with interest in ancient and modern cultures, as well as plants and plant medicines.
Container Gardening
With cacti and succulents

By Kent Newland, City of Phoenix Water Conservation Office

Cacti and succulents offer desert gardeners some of the boldest landscape forms and spectacular floral displays for their gardens. There is a vast assortment of cacti and succulents that make great container plants. Cacti and succulents that quite frankly struggle in the landscape with hot summers, cold winters, hungry rabbits and less than perfect drainage, do remarkably well in containers. Especially with container gardening you are constructing landscape vignettes that echo your garden. Gardeners should consider design, horticulture, and watering practices when working with cactus and succulents.

Design
Gardeners should consider their growing space, containers and desired plants. Cacti and succulents are highly collectable, perhaps too collectable. With limited growing space on a patio, one has to be selective as to what cacti and succulents are best suited and worthy of containers. Large prickly pears, columnar cacti, agaves, and aloes can soon overwhelm containers and are best planted in the landscape. However, one can grow juvenile columnar cacti and leaf succulents in containers, to toughen them up for eventual planting in the landscape.

There is nearly an infinite type, style and color of containers-plastic, clay, fiberglass, wood, metal and concrete. All containers should have a drainage hole. Gardeners can customize their containers by painting them to match their color palette. I like to work with plastic terra cotta - fairly cheap, easy to move, resilient to summer heat/winter cold and promotes good plant growth. You can be creative with cactus and succulent containers. I like to contrast foliage, texture and flowers. For example, the gray, bold form of Parry’s Agave (Agave parryii) in contrast to the green foliage of Jelly Beans (Sedum rubrotinctum), and the deep yellow form of Golden Barrel (Echinocactus grusonii) in contrast to the brilliant red cerise flowers of Red Spike Ice Plant (Cephalophyllum Red Spike).

Horticulture
Soil Mixes
A major concern in container gardening is an appropriate growing medium for our desert environment. Following are a couple of things most cactus growers agree upon Soil mixes must have:

- Good drainage.
- Promote healthy root growth.
- Easily wet up and slowly dry out over a period of time.

Many potting soils are formulated for damp and foggy California and Northwest environments. These potting soils are often high in organics that are difficult to wet up (hydrophobic) and can become too water logged (hydrophytic) for containers. However, most potting soils are suitable for containers when amended with pumice and sharp sand. I customize a mix of

- 1 part potting soil
- 1 part pumice
- 1 part sharp or wash sand.

This will provide good drainage, aeration of the roots and some organics for plant growth.

Continued on next page.
Watering/Fertilization/Seasonal Dormancy/Light

Watering is the single most important thing in regard to container gardening. Cacti and succulents are fairly undemanding in containers. I check my containers on a weekly basis and if dry I give them a thorough watering. Regular fertilization of cacti and succulents when they are actively growing promotes healthy growth and flowering.

Many leaf succulents such as aloes, agaves, ice plants and globular cacti go fairly dormant in the heat of summer, whereas euphorbias, stapelias, adeniums and pachypodiums are dormant in the winter and are active summer growers.

Most cacti and succulents prefer bright light to grow and flower. Cacti that grow in deep shade become spindly and rarely flower. However, leaf succulents such as haworthias and gasterias can take fairly low light. Experiment with some of your favorite cacti and succulents, to determine if they can grow on your patio with varying light situations.

A Short List of Cacti and Succulents for Containers

**Cacti**
Dwarf Prickly Pears and Chollas, *Tephrocactus*

Columnar Cacti (*Pachycereus, Cleistocactus, Espostoa, Oreocereus, Echinocereus, Stenocereus, Myrtillocactus, Stetsonia, Eulychina, Pilosocereus, Cereus, etc.)*

Globular Cacti (*Ferocactus, Echinocactus, Mammillaria, Parodia, Echinopsis, Gymnocalycium, Rebutia, Eriosyce, Thelocactus, Coryphantha, Matucana, etc.)*

Hanging Baskets (*Rhipsalis, Aporocactus etc.)*

**Leaf Succulents**
Aloe, Agave, Haworthia, Gasteria, Nolina, Dasylirion, Yucca, Sansevieria, etc.

Mesembs–Ice Plant Family–(*Cephalophyllum, Malephora, Glottiphyllum, Faucaria, etc.)*

Crassulaceae – Live Forever Family–(*Graptopetalum, Sedum, Kalanchoe, etc.)*

**Stem Succulents**
Euphorbia, Pedilanthus, etc.

Stapeliads–Milkwed Family–(*Stapelia, Hoodia, Huernia, etc.)*

Caudiciforms (*Adenium, Pachypodium, Pachyormus, Bursera, Cyphostemma, Fouquieria, Zamiacaulcas etc.)*
A Flood of Resources Available on Landscape Watering

By Donna DiFrancesco, Master Gardener and Water Conservation Specialist, City of Mesa

Ask five landscape experts how to water a tree, and you will likely get five different answers. Watering provokes some of the most conflicting advice of all landscape maintenance activities because standards are too difficult to define compared with the well-developed standards we see for planting, fertilizing, and pruning. Believe it or not, there are even ANSI (American National Standards Institute) standards for tree pruning.

Plant water needs are affected by many factors. Just a few considerations are tree type, plant size, plant establishment (maturity), soil type, and season. Water may also be used more efficiently if the plant is not over fertilized, if beneficial mycorrhizae (symbiotic tree root fungi) exist, if organic mulches are used over the root area, or if soil is healthy. If you put all of those factors in a matrix, you can see why it’s challenging to offer standard watering advice. Then, consider all of the different water application techniques… bubblers, drip, sprinklers, etc. and well, it’s nearly impossible to provide simple instruction.

Deeply and infrequently is often the mantra that we hear. But just how deeply and how infrequently should you water? We talk to so many people that water every day, or even twice a day for 10 or 15 minutes. Perhaps this happens because the install landscaper set the controller at the time of plant installation and the program never got changed. Whatever the reason, trying to get people to program longer run times with drying periods in between is good advice. But it’s difficult to get even seasoned gardeners to believe that plants can go weeks at a time without water. As arid as it is here, landscape plants probably suffer more from over watering than under watering. We need water every day, don’t our plants? While water is definitely necessary for plant health, too much water in the soil means too little oxygen for the plant roots, and this can slow the uptake of nutrients and encourages disease organisms to invade. Too much water can also cause excessive and rangy growth requiring more frequent pruning. And, over watered trees are more susceptible to blowing over or may have a weaker structure. Worst of all, if you are over watering, you are also wasting water.

Resources are now available to Valley residents that define watering as detailed as we can with the current knowledge that we have. Thanks to research by the University of Arizona, we have a good idea of plant water requirements throughout a typical Arizona low desert season. Work done by Dr. Paul Brown, Dr. David Kopek, Terry Mikel, the late Dr. Jimmy Tipton and others has offered enough data to provide some guidelines for gardeners to follow. Additional work by Steve Priebe and Andy Terrey at the City of Phoenix helped to confirm practical applications of watering techniques. A combination of this research was used to help create the following:

Continued on next page.
Landscape Watering by the Numbers: A Guide for the Arizona Desert was developed by Robyn Baker (Water Conservation Specialist from the City of Scottsdale) and me in 2001. The booklet will take you step-by-step through the process of defining what your plant water needs should be and how to determine a water-scheduling program. The title evolved from the fact that there are so many numbers that are important to look at when it comes to watering... how many feet deep should you water, how many gallons should you apply, how many minutes or hours should you run your irrigation, how many days in between waterings. This free booklet is available from your city water conservation office, and many cities supply local nurseries with the booklet.

An interactive website was developed by Mesa and Scottsdale just last year that takes you through the same watering instructions. I was giving a talk about the booklet once and a participant from the audience said “you want us to do calculus”... and I said “oh no, actually it’s algebra.” While she probably didn’t appreciate my attempt at humor, we understand that some people may be a little intimidated with the math involved on the run time worksheet. This website offers an interactive worksheet that does those calculations for you in a snap. Find the website at www.wateruseitwisely.com. You will also find your city water conservation office contact numbers at this site.

A monthly watering reminder that recommends landscape watering frequency is also available to anyone with an Internet account. Last March the City of Mesa created a “Landscape Watering Reminder” e-mail list-serve. Anyone can subscribe to the service. To register, visit www.cityofmesa.org and select E-mail News Lists from the left navigation bar. Choose Landscape Watering Reminder and follow the registration instructions. We currently have about one thousand subscribers.

More information on watering can also be found in Desert Landscaping for Beginners and Earth-Friendly Desert Gardening by Arizona Master Gardener Press. And just one more resource to remember ...YOU, because “plants don’t save water, people do.”
Mud Pies and Ugly Bugs
by Tyler Storey and Lucy Bradley, The University of Arizona Cooperative Extension

Mud pies, ugly bugs, food, and playing outdoors fit almost any kid’s idea of fun. They also make up one of the most successful integrated education programs available to children today.

The Junior Master Gardener (JMG) Program is an international 4-H youth gardening program of the Cooperative Extension network. Through a hands-on curriculum centered on the wonders of the growing world around us, JMG engages children in novel group and individual learning experiences that promote a love of gardening, develop an appreciation for the environment, and cultivate and expand a child’s mind. JMG inspires youths to be of service to others through service-learning and leadership development projects, and rewards them with certification.

The JMG integrated horticulture and environmental curriculum provides parks and recreation leaders with a variety of approaches to help children relate their studies to their daily lives. Throughout the country, thousands of leaders are trained each year by national, state and local JMG staff and volunteers. The Junior Master Gardener Program is providing a positive solution to many after-school programs and communities for children to grow and succeed.

Recently yet another study confirmed what many of us already know: bored children, children who are stressed, children who are “lost” in the crowd, are children who are more likely to smoke, drink, and use illegal drugs at a young age. Programs such as the Junior Master Gardeners help to combat those problems by encouraging and supporting a child’s natural curiosity and by providing a constructive focus for a child’s innate sense of awe and wonder. And when students are enthusiastic and engaged in their learning, they improve their achievements in problem solving, critical thinking, decision making, and in academics.

Every year in Maricopa County alone, adult Master Gardeners volunteer more than 35,000 hours of community service. Most of these volunteers share two things in common: when they were young, someone took the time to instill in them a love of growing things, and someone taught them the importance of service to their community.

The Junior Master Gardener Program is only one component of the International Award-winning youth gardening program at the University of Arizona Cooperative Extension. We would welcome the opportunity to provide you with more information on how the Maricopa County youth gardening program could work with your staff to help nurture future generations of committed citizens, not just as gardeners, but as community leaders and dedicated volunteers in all areas of our society.

All starting with mud pies and ugly bugs.

Note: This article previously appeared in the Arizona Parks and Recreation Magazine
**The Arizona Native Plant Society**
A branch of the National Native Plant Society, this statewide nonprofit organization is devoted to Arizona’s native plants. Its mission is “to promote knowledge, appreciation, conservation, and restoration of Arizona native plants and their habitats.” Membership information is available on the site.
http://aznps.org/

**Pesticide Compendium**
This site lists more than 1000 pesticides (acaricides, fungicides, herbicides, insecticides, nematicides, and plant growth regulators) by the common names assigned to them by the International Organization for Standardization (ISO). It includes indexes of common names, molecular formulae, International Union of Pure and Applied Chemistry (IUPAC) systematic names, non-ISO common names, updated data sheets, Chemical Abstract Service (CAS) registry numbers, and classifications. There’s even an alerting service included.
http://www.alanwood.net/pesticides/

**Candied Kumquats**
The kumquat has long been considered a symbol of prosperity in the Orient, and they are often presented as gifts during the Chinese New Year. If you are fortunate enough to have a tree growing in your yard, or you know someone who does, here is an opportunity to learn how to turn these tart little gems into candied treats that you can serve to your guests at your next backyard get-together.
http://www.themediadrome.com/content/recipes/candied_kumquats.htm

**Monarch Metamorphosis**
A series of sharp, clear photographs of this beautiful butterfly forming, as well as emerging from, its chrysalis. If you let your mouse pointer “hover” over each photo, an explanation of exactly what is taking place will magically appear.
http://www.milkweedcafe.com/photos.html

**Poisonous Plants**
The Animal Science department at Cornell University sponsors this site, entitled “Poisonous Plants Informational Database.” It is a good reference for plants and other natural flora that may possibly cause harm to animals. It includes information on botany, chemistry, toxicology, diagnosis, and prevention. Also contains a list of FAQs (Frequently Asked Questions) and offers this important cautionary message from the authors: “Just because something is on the poisonous plants list doesn’t mean it can’t be a good food or feed, and just because it is absent from the list doesn’t mean it is safe!”
http://www.ansci.cornell.edu/plants/
Do Your Plants Suffer from Indecent Exposure?

By Catherine Rymer, Water Conservation Specialist, Town of Gilbert, Certified Arborist

Here in the Southwest doctors advise against prolonged exposure to the sun. But did you know that plants could also suffer from sun damage and water stress if they are excessively or incorrectly pruned?

Plants that are continuously or improperly pruned require more water. In trying to replace the foliage that has been removed, plants use more water and nutrients. Here are a few pruning mistakes that should be avoided.

Extreme Pruning
Trees are the most important living element in our landscapes making their ensured health a priority. The pruning of live branches removes important parts of the tree that manufacture food for the entire plant. Severe pruning stresses trees and requires them to use stored food reserves. In the process, wounds are created that can permanently disfigure the tree and provide a perfect entry point for pathogens to invade tissues which eventually weakens the entire tree.

When branches are removed, they can never be replaced. To be safe, use the ‘rules’ of pruning by only removing dead, diseased, dying or crossing branches. Of course if a branch is obstructing a walkway or is a hazard it should be removed for safety. Limit the removal of branches to only what is absolutely necessary and never remove more than 25% in any year. While deciduous trees are best pruned when they are dormant, usually in January, remember that most desert-adapted trees should be pruned in May or early June.

Geometric Shapes
Shaping shrubs into round, cylinder or cupcake shapes requires repeated pruning with shears. This not only destroys their shape and blooming potential, it causes the lower part of the shrub to become bare and twiggy. Eventually only the top of the plant is crowned with leaves. More importantly, it increases the plant’s water demands as it replaces foliage lost to pruning. If shrubs are touching or growing into other nearby shrubs, consider removing every other plant.

If shrubs need to be pruned for size control, then use hand pruners to selectively cut back and remove branches, staggering the cuts to maintain or reduce the size of the shrub while preserving its natural form. This ‘selective’ or ‘natural’ pruning only needs to be done once a year unless the plant is being over watered - which generates excessive growth.

Continued on next page.
Feather Dusters
Palm trees are another victim of excessive pruning. If there are only three or four fronds remaining after pruning, the tree has been pruned excessively and improperly. Only the lower leaves, the ones that have turned brown or are yellowing, should be removed. Pruning more than this can stress the tree and make it vulnerable to diseases and pests. If annual pruning is done in June, the bloom stalks can be removed at the same time.

Still Confused?
If you’re in doubt about whether or not to prune a tree or shrub, then you probably shouldn’t. Most plants require only annual pruning for optimum health; some need no pruning at all. But if you must prune, here are a few tips to use to help you succeed.
1. Determine your pruning goal. For trees, the age will determine the type and degree of pruning required. Trees 2 – 5 years old may require light pruning once or twice a year to direct growth. Mature trees seldom need pruning more than once every five years or so.
2. Know the proper time to prune.
3. Less pruning is often better. Some plants don’t require pruning, only minor grooming. Never remove more than 25% of a plant’s foliage in any year.
4. Remember your objectives: Safety, health and appearance - in that order.
5. Be patient. Sometimes it requires more than one season to achieve certain pruning objectives, especially things like restoration from storm damage.
6. Use the right tool depending on the size of the branch to be removed.
7. Make proper cuts with reference to the branch bark ridge and the branch collar on trees and to nodes and lateral branches on shrubs. (See references below)

Once you get started pruning it is often difficult to stop. Try these ideas to prevent excessive pruning.

- Always begin with a plan and stop when you have accomplished your goal.
- Never prune a plant you love when you are angry.
- Begin with your fastest-growing, toughest plants. This way your enthusiasm may wear off before you get to your expensive or slow-growing plants.
- Don’t clean up the clippings from your plant until you are done. This way it will remind you how much foliage you have removed.
- Stop periodically to assess what you have done and what is left to do.
- Ask someone to interrupt every half hour to see if you are finished yet.
- Never remove more than 25% of your plant in any one year. Removing more can starve or stress your plant making it vulnerable to sunburn, pests and diseases.

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### Best Time to Prune (Phoenix metro area)

| Desert Adapted Trees | Early summer (May – early June) |
| Desert Adapted deciduous trees | During winter dormancy (January) |
| Conifers (pines, junipers, cypress) | During winter dormancy (January) |
| Citrus | Don’t prune except for hazards or health |
| Spring-blooming shrubs | After bloom is finished |
| Summer-blooming shrubs | During winter dormancy (January/February) |
| Frost-sensitive shrubs and trees | Remove damaged foliage after danger of frost has passed (late February into March) |

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To learn more about the correct pruning of desert plants try "Pruning, Planting & Care", by Eric A. Johnson. It is filled with great information and step-by-step instructions. ISBN 0-9638236-5-1.

AZ1048 Care of Desert Adapted Plants - http://cals.arizona.edu/pubs/water/az1048.pdf
**Playing Plant Detective**

By Russ Thompson

Reprinted with permission from Southwest Trees and Turf

Every year, I receive numerous phone calls from clients stating that a pine tree is turning brown or branches of a shade tree are dying. Of course, they frequently think that some exotic pest is devouring their landscape and my attempts to calm them down are usually futile. So, I tell them not to worry and make an appointment to meet with them as soon as possible. More often than not, my inspection of the tree reveals that the problem isn’t insect- or disease-related, but a cultural and/or environmental issue.

I can’t stress to you enough that when investigating landscape plant problems there is no “slam dunk” and you must always determine whether the cause is biotic (living) or abiotic (non-living).

Biotic factors include pathogens such as insects, mites, fungi, bacteria, and viruses. If left untreated, these pathogens will likely spread from one plant to the next. Abiotic problems include temperature extremes, water, poor soil conditions, construction, drought, chemical damage, transplant shock, and mechanical injuries. These non-living maladies are not transmitted from one plant to another.

Now, determining whether the problem is living or non-living sounds easy enough. However, this is not always the case, as many biotic problems are secondary. In other words, insects and/or diseases have a tendency to attack an already stressed plant. Therefore, an insect may be present, but not necessarily the cause of decline.

Additionally, many biotic and abiotic problems are similar in appearance. Mechanical damage, due to a wire tie being left on too long, can be easily confused with water stress. Poor leaf color and/or stunted growth, from an over application of herbicide, could be diagnosed as a need for fertilizer and so on.

Here are some of the more common abiotic disorders I’ve encountered when hunting for that exotic pest:

**Leaf Scorch:** High temperatures and drying winds lead to a rapid loss of water, especially in broad leaf deciduous trees such as sycamore, causing the leaf margins to turn yellow or brown and fall prematurely. This problem can be avoided by planting susceptible trees in locations protected from long exposure to sun and/or wind.

**Drought:** Symptoms of drought appear when loss of moisture through the leaves exceeds uptake of water by the roots. This is caused by inadequate soil moisture during the warmer times of the year. The symptoms usually include wilting, off-color foliage, twig and branch dieback, and the death of fine feeder roots. The loss of these roots can lead to complete failure as uptake of water is prevented even if moisture is restored to the soil.

Keep in mind that a lack of water will usually cause the tree to die back from the top down and from the outside in.

**Over Watering:** The roots of plants in waterlogged soils are usually killed by a lack of oxygen; and roots require almost as much oxygen as they do water. As excessive water is applied, the oxygen is displaced, which leads to suffocation of the plant. This is a common problem in heavy clay soils that have poor drainage.

Symptoms of oxygen deficiency closely resemble those of drought injury. When the roots suffocate and die off, the upper portion of the plant will appear as though there is a lack of water. Most people, especially in the desert southwest, will add more water to the wilted plant, which only compounds the problem.

**Nutrient Deficiency:** Certain nutrients -- nitrogen, phosphorous and potassium being the most important -- are needed for proper plant development. Other “micro-nutrients” such as iron, zinc, and manganese are also needed to maintain good overall health and green color. The symptoms of nutrient deficiencies vary from chlorotic leaves, to stunted growth, to plant death. These symptoms can easily be misdiagnosed as a disease problem. It is always best to submit a soil sample to the lab for a true analysis and recommendations.
Herbicide Injury: Herbicides, when improperly applied, can easily damage a tree. Leaves and stems will be distorted, stunted, cupped, and/or discolored. Most established trees will survive a minor contamination, but development will be slowed. Always apply chemicals according to manufacturer’s recommendations. A great deal of research goes into their development and, in most cases, “more is not better.”

Mechanical Damage: Usually, mechanical damage is caused by lawn mowers and string trimmers banging or ripping the bark off a plant and damaging the cambium layer. As a result, the sap flow between the roots and the leaves, twigs, and branches is disrupted leading to a scattered dieback throughout the tree.

As you can see, there are numerous non-living problems that can lead to plant failure in the landscape. To properly diagnose these problems, one should have a strong educational background, field experience, problem-solving abilities, and follow a step-by-step diagnostic strategy.

1. **Identify the plant.** From proper identification, you can get an understanding of its growth characteristics, cultural requirements, and common problems.
2. **Identify the symptoms.** The symptom is how the plant responds to the problem, i.e. discolored leaves, abnormal growth, etc.
3. **Inspect the whole plant.** Inspect the leaves, branches, trunk and roots, and not just the injured area.
4. **Inspect the site.** Examine the plant’s environment and look for conditions that may have contributed to the injury.
5. **Look for patterns.** Are symptoms uniform throughout the plant, scattered, on one side only? Are all the plants affected or only one?
6. **Investigate the maintenance history.** Collect as much information as possible. When was it planted? Has it been fertilized? How is it irrigated?
7. **Compile the information.** Once the information has been gathered, identify all possible causes of the problem.
8. **Test likely causes.** If necessary, submit tissue and/or soil samples to the lab.

Finally, take before and after photographs. This will help you determine whether or not treatments are working.

Oh, by the way, please let me know if you ever encounter that exotic pest!

*Russ Thompson is a certified arborist and consultant in Las Vegas, NV.*
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To order by mail, send check payable to University of Arizona. Add $4.00 shipping per book.
Mail to: Arizona Master Gardener Press, University of Arizona Cooperative Extension, 4341 E. Broadway Road, Phoenix, AZ 85040-8807. Sorry, no credit cards.

Books are available for purchase at Maricopa County Cooperative Extension, 4341 E. Broadway Road, Phoenix, AZ, 85040, Monday-Friday, 8-5. For information, call 602-470-8086, ext. 312.

For further information, including retail outlets that carry the books, visit our website:

http://cals.arizona.edu.maricopa/garden
Top 10 Reasons to Become a Master Gardener

1. Attend 17 weeks of certification training; get garden smart.
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