High on the Desert Cochise County Master Gardener Newsletter

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The University of Arizona and U.S. Department of Agriculture Cooperating

The Virtual Gardener — Managing Fertilizers

Plants, like people, need a healthy diet to survive and thrive. Their "diet" comprises the minerals they absorb from the air and soil and use to create tissues and generate energy. Fourteen of these minerals are derived from the soil and three of those-nitrogen (N), phosphorus (P), and potassium (K)-called primary nutrients because they are used in large quantities, are frequently depleted in the soil.



Because the primary minerals are usually deficient in soils and potting mixes, it is often necessary to add fertilizers to provide adequate amounts for optimum plant growth, especially for vegetables and exotic ornamentals not adapted to local soils.

The three numbers you see on fertilizer packages indicate the percentages by weight of the three primary nutrients. The first number is the percentage of elemental nitrogen (N); the second is the percentage of phosphate (P_2O_5) ; and the third is the percentage of potash (K_2O) .

We manage fertilizer use using the "Four **R**s." Use the **R**ight nutrient, at the **R**ight rate. at the **R**ight time, and in the **R**ight place.

Applying these rules is not as easy. We know plants need NPK in large amounts but exactly how much of each need to be added depends on how much is already present in the growing medium (soil, potting mix, or other), its availability to the plant (pH, proximity to roots, and other factors), and how much the plant is demanding (growth stage, soil and air temperatures, and other factors). Using too much fertilizer is wasteful, harmful to the environment, and threatens the health of our plants. Using too little also threatens the health of our plants and does not allow them to achieve optimal performance. For this reason, professional growers often use specialized software to help them manage their fertilizer applications. These sophisticated programs integrate the results of laboratory tests of water, soil, and plant tissue, weather/climate data, and detailed information about the specific crops being grown to make recom-(Continued on Page 2)



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mendations for fertilizer application scheduling.



Illustrative diagram of demand for nutrients at different stages of growth. Each plant will have a slightly different set of demand curves.

(adapted from diagram at

http://www.smart-fertilizer.com/ articles/ timing-fertilizer-application)

Fertilizers come in three basic forms: quick release (QRF), slow release (SRF), and controlled release (CRF).

QRFs come in powder, granular, or liquid form. They quickly dissolve in water and are immediately available to the plants. They may be broadcast on the soil surface, applied directly on or around the plants, or applied as side dressings.

QRFs demand the most intense management by the grower. They should be applied at several different times and formulations throughout the growth cycle of the plants and adjusted for rainfall and temperature conditions. Plant performance should be carefully monitored throughout the season to watch for signs of over or under fertilization and adjustments made accordingly. Insufficiencies can be remedied by adding more fertilizer and overdoses can sometimes (but not always) be corrected by heavy watering to leach out the excess. As with any garden chemical, they should be used by carefully following the instructions on the package.

SRFs include organic materials compost, manure, fish emulsion, *etc.*—and so-called "synthetic" organics. Because SRFs release their nutrients slowly as they are digested by organisms in the soil, there is less danger to the plants from burning due to rapid release of too much nitrogen or other salts into the soil.

Incorporation of organic materials into the garden has many advantages. It not only

improves the nutrient content of the soil but improves soil texture and moisture-holding capacity as well. The downsides include longer lead times before nutrients are available to the plants and uncertainty concerning the rate of release of the nutrients. The breakdown of organic materials is dependent upon microbial activity in the soil which in turn is dependent upon temperature, moisture, and other factors and can be highly variable.

The synthetic organics are manufactured chemicals made by combining urea with various other chemicals to make a highly insoluble nitrogen fertilizer. Look for the letters "WIN" and a number on the package. The number gives the percentage of water insoluble nitrogen (WIN) in the product. So-called food spikes for trees and some slow-release fertilizers for turf are synthetic organic fertilizers.

CRFs have been around for about 50 years and have gotten progressively better and more inexpensive over that time. Today it is difficult to find a plant in a garden shop or nursery and not see traces of CRFs in the pot, although the plants are usually grown using QRFs and the CRF prills only added to sustain the plant during shipment and in the retail store.

The basic concept behind CRFs is easy to understand, but the technology behind the concept is quite sophisticated. Basically a CRF particle is a small package of soluble fertilizer encapsulated within a resin or polymer coat or shell. The fertilizer may include only primary nutrients or both primary and micro nutrients. Read the information on the package to determine what is in the mixture.

The shell is designed to become semi-permeable under certain moisture and temperature conditions. When this happens, it allows the soluble fertilizer to diffuse through the shell into the surrounding medium at a precisely controlled rate. Ideally the amount of fertilizer released matches just what the plants need, no more-no less.

CRFs come in different nutrient formulations and longevities ranging in several increments from 3-4 months to a year or more. This allows the



grower to pick a CRF with a time span appropriate to the plants being grown. Use a CRF with a shorter time span for summer annuals and a longer time span for long-living perennials which you can refertilize annually.

The longevities of the CRFs are temperature dependent and the numbers furnished on the package are based on testing done by the manufacturer. Most manufacturers test at soil temperatures of 70°F and a few test at 82°F. The life span of the CRF will be shorter if soil temperatures are higher than the testing temperature is and vice versa. AZMET data for the Bonita station about 20 miles north of Willcox, Arizona shows that in June, July, and August soil temperatures at a depth of 20 inches can reach 90°F, so the lifespan of a CRF calibrated for longevity at 70°F will be much shorter than the package indicates. And soil above temperatures in ground containers exposed to direct sunlight can be even higher. One study from Virginia Polytechnic Institute showed release rates can be up to nearly five times faster at 40°C (104°F) than at 20°C (68°F). In a personal communication to me the makers of a popular prilled CRF, recommended applying their product when daytime highs are not expected to exceed 85°F!

There are basically four ways of applying CRFs. They can be sprinkled on the surface of the soil or planting medium, uniformly mixed into the medium, placed in the planting hole below where the plant will be installed (called "dibbling"), or placed in a layer at some level below the surface of the medium. I have had good luck using (Continued on page 3)

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the first method and mixing the fertilizer pellets into the top couple of inches of the soil. Follow the directions on the package to determine the amount of the product to use.

Fertilizer management is a very technical and complicated topic. If you would like to learn more about it, here are some resources available on the web:

There is lots of information about fertilizer management on the web. Check out some of these websites:

- <u>Comprehensive discussion of all</u> <u>aspects of plant fertilization/</u> <u>nutrition aimed at commercial</u> <u>growers.</u>
- <u>Selecting and Using Organic</u> <u>Fertilizers</u>
- <u>Selecting and Using Inorganic</u> <u>Fertilizers</u>

Until next time, happy surfing!

Gary Gruenhagen, Master Gardener virtualgardener@cox.net

Spring Plant Sale

The Third Annual Master Gardener Spring Plant Sale was held at the UA Sierra Vista on Saturday, April 22 and was truly successful in both missions for which we produce the sale educational and fund-raising. For more about the sale and photos see Page 6.





- Check tree ties
- Remove stakes if tree can stand alone
- Mulch trees and shrubs
- Remove faded flowers & fertilize roses
- Stake tomato plants and watch for curly top—remove
- Prevent blossom end rot by even watering
- ♦ Water! Water! Water!

Cuttings 'N' Clippings

The CCMGA Annual Business Meeting will be on Thursday, June 8 at 2:00 PM in Room 503 UA Sierra Vista. Bring your favorite cuttings or starts to share or trade with others!

Every Wednesday morning until further notice, Master Gardener work sessions in the Discovery Gardens will be from 9:00 AM to noon. Come and stay a few minutes or the whole morning. Every little bit helps! Bottled water and coffee always available

For Cochise County Master Gardeners Association information contact Valerie at:

<u>valerieda-</u>

<u>vidson@email.arizona.edu</u> or the Cochise County Master Gardeners web site at:

http://cals.arizona.edu/cochise/mg/

You can also follow them on Facebook at:

<u>www.Facebook.com/</u> <u>CochiseCountyMasterGardeners</u>

Water Wise will be holding the next workshop on **Saturday, June 3** from **9:00—10:30 AM** at UA Sierra Vista, Groth Hall PMR. Want to improve your acreage or home landscape with beautiful, strong and well adapted native grasses and wildflowers? Learn how from our next presenter, Jim Koweek! Contact the Cooperative Extension at 458-8278, Ext. 2141 for more information. Check out the Water Wise web site for their 2017 schedule at:

http://waterwise.arizona.edu/

The Cochise Chapter of the Arizona Native Plant Society will resume meetings in September. For more information, follow AZ Native Plant Society on their web site:

http://www.aznps.com/chapters/ cochise/cochise.htm

Cochise County Master Gardener Newsletter Editor Carolyn Gruenhagen

Helping Your Plants Through June

In May of 1977 we moved into our first home in Sierra Vista. Being a young, first time home-owner and a totally inexperienced gardener, I was outside trying to figure a starting point to polish up a yard that had been long forgotten before we moved in. My new next door neighbor, longtime gardener, Betty Blom, came out with her welcoming hello and we began to chat about our yards. Of all the things she said to me that day, one sentence stuck with me. "If you can just get your plants through the month of June and keep them alive, you've got it made! Don't get discouraged." I hear her voice in my head every year at this time.

June is brutal. The earth is brown, dry, and hot. The grasses are deep beige and void of moisture. The Mesquites are hunkered down in appearance, waiting for the monsoon of July. Even the evergreen native Emory Oaks in the Huachucas will often drop leaves in their defensive action of saving internal moisture and energy. The heat intensifies each day as the month of June progresses. A friend from Alabama once visited for the first time during the month of June and asked, "How can you stand to live in such a harsh climate, much less, even try to garden!?"

But she had not seen July. More importantly, she had not seen August! That heat we loathe in June is a necessity for bringing in the glorious monsoon of July and August, which in turn, produces a desert beauty which is second to no other place I've seen. The desert beauty of July-August-September is a magnificent thing to experience.

Ok. Now, back to June.

The searing heat can cause young plants to struggle and can even cause set-back in well-established garden and landscape plants. While it sounds like common sense, and it's easier said than done in the desert heat—just try to not let the soil completely dry out. That is most important. Roots draw up water that is then transpired by the leaves. If the water source dries up, the leaves begin to lose water from their cells. The plant may then lose its turgidity and begin to wilt. As the drying process progresses, more and more cells start to die. Even a small wilt from *(Continued on page 4)*

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water stress can cause damage to a plant. Many people believe that morning is the most beneficial time of day to water plants. But water any time you see the first signs of wilt or stress.

One exception here is that some of the larger-leaved plants will droop slightly during the hottest part of the day, even when it's had enough water. This is a normal reaction which is considered to be a protective measure used by the plant. In this instance, when the sun gets too intense for the leaf, it shifts its angle by wilting so that its surface receives less sunlight. As the day cools off, the plant will re-gain its turgor.

Another important point in keeping your plants watered well in June is that well-hydrated, less-stressed plants are far more resistant to attack from pest and disease. Water-stressed plants can almost become an invitation to pests and disease processes.

There are a few measures that can be taken to keep your plants a little healthier during this challenging month—most of which you've heard before, and most of which are common sense.

1) The most important—when you water, water thoroughly and deeply to ensure the entire root mass, large or small, has had a complete drink. Then, water less frequently. Absolutely the most frequent mistake folks make when watering is to water too shallowly. This practice causes the roots to stay in the upper portion of the soil, near the surface, which is the only place they can find water. The problem? This surface part of the soil is the hottest and most exposed part of the roots' environment. Plus, the remaining section of the root ball always remains thirsty and does not develop health and vitality. Watering thoroughly and deeply will cause the roots to follow the water down to the level where they have a cooler environment and more constant source of moisture.

2) This is not exact math, but it's close and a decent "rule of thumb." Depending on the type of soil you have, "it takes approximately 1 gallon of water to saturate approximately 1 cubic foot of soil." So, envision the amount of area taken up by the roots of your plant, and give the appropriate number of gallons of water.

Think about this when setting your irrigation system as well. Another common thing I hear is "I don't know why my plant is doing poorly. I run my drip system every day!" When I look at the emitter on the plant, it is a 1GPH emitter (1 gallon-per-hour). When I ask how long they're running the system? The answer is frequently, "I run it for 15 minutes!"

Again, let's do the math. 1 gallon-perhour emitter running for 15 minutes has only delivered 1 quart of water, which will only penetrate an inch or two of soil, if that. Then, running that pattern every day gives moisture only in the top inch of soil, keeping the struggling roots only in that top inch where the soil is hot and baked. That would be like offering you ¹/₄ cup of water occasionally when you're thirsty and never giving you the full glass!

All that said, install a sufficient number of emitters to deliver the sufficient number of gallons per hour, needed by the plant's root size. Run the system for an hour so that your calculated number of needed gallons is delivered. Then, run the system less frequently, determined by when the top couple of inches of soil begin to dry out.

3) Speaking of irrigation systems, this is an important time to do maintenance—checking performance of your emitters while the system is running, checking the position of your emitters, and checking for leaks, *etc*.

4) If you do not have an irrigation system, consider installing one. I resisted this for years, insisting that I handwater everything, believing I was bonding with and checking on each of my plants as I hand-watered from the hose. Then, one year, I tried irrigation on a small section of my yard. What a wake-up call I experienced!! I had been so totally wrong!

Yes, irrigation systems can have their annoyances. But, for every pound of irritation, you will experience 10 pounds of positive results in a) water savings b) time savings and most important c) huge difference in plant performance!!!

5) Top-dress! Top-dress the soil beneath your plants with a mulch of your choice compost, decomposed bark, decorative gravel, *etc*. This keeps the soil and roots cooler. This will help retard weed growth around your plants. Above all, this will help keep moisture in your plant's root zone. (It will also keep the roots warmer in the winter!)

Top-dressing is another essential lesson I learned the hard way. When I moved into our present home, I landscaped both sides of a large driveway. I got the plants installed and the irrigation system in. But I only top-dressed one side of the drive-way with decorative gravel as I ran out of time. One weekend led to another and I never finished the other side. At the end of the season, the plants on the top-dressed side were nearly double in size, bloom, and vitality as the soil had been kept cooler and moisture more efficiently retained. Visual proof!!

6) Try to avoid applying fertilizers during the heat of June, as the roots' ability to absorb nutrients is diminished during extreme heat. Wait until after the rains have begun as the roots will be better hydrated and the soil temperatures will be cooler.

7) While many areas of the country will tell you not to get leaves wet so as to avoid disease, in our dry heat of June, the leaves certainly do not stay wet for longespecially when watered in the morning. I like to spray many of my plants in the mornings for several reasons. 1) Many plants can take in extra moisture through their leaves or conifer needles. 2) Spraying the dust from the leaves a) eliminates habitats in which spider mites thrive and b) allows the stomata in the leaves to "breathe" more efficiently. 3) Strong sprays of water on some plants may be proactive in helping to eliminate pests such as aphids, thrips, and whiteflies.

Bottom line – water appropriately, efficiently, consistently, and top-dress your soil. Hang in there. Especially to those of you who have just moved here. June is a necessary challenge in the High Desert that leads us to a most beautiful season!

Jan Groth, Master Gardener Program Coordinator

At a Glance Box

It's a Bloomin' Cochise County Native Plant of the Month

Plant: Daleas, *Dalea species*

Description: Evergreen shrubs, groundcovers, forbes
Blooms: Small purple, yellow, or white flowers
Water Need: None to little
Use: Natural areas and specimens
Culture: Well drained, rocky hillsides. Full sun to partial shade. 4,000-8,000' elevation.
Learn more: Cochise County Herbarium, <u>www.cochisecountyherbarium.org</u>
For an in-depth article, see below.

Cado Daily, Guest Author Water Resources Coordinator, Water Wise Program – Retired!

Dalea

I have a lot of favorite local native plants, but one genus that really gets me going is *Dalea*. The common name is the same as the genus name, pronounced "DAY-lee - ah." The pronunciation is not forgiving as with saying "tomato" or "tomahto" because if you say "DAWH-lee-ah" instead of "DAY-lee-ah" at a nursery, you will come home with a cold-tender, richsoil loving, highly cultivated flowering plant. What you really wanted was a "DAY-lee-ah", a butterfly-magnet, tough native plant.

I get jazzed about the daleas because not only does the genus include plants native to southern Arizona, Baja California and the Chihuahuan Desert, but the plants grow in inhospitable habitats of rocky, dry, poor soils. What is even better, is finding the showier daleas sold in local nurseries. Because daleas are so hardy, production nurseries have developed enhanced varieties. In my yard, I planted a lovely 'Monterrey Blue', (Dalea bicolor v. bicolor 'Monterrey Blue') developed bv Mountain States Nurserv. 'Monterrey Blue' is a selection from the Chihuahuan desert and Baja California native *D. bicolor v. bicolor*. My plant (better said "plants" at this point) grows without any supplemental water on my south facing rocky hillside. It now has off-shoots that bloom with abandon to the delight of clouds of yellow Sulphur butter-flies.

Another fantastic dalea is the "Trailing Indigo Bush," *Dalea greggii*. It is a Cochise County native and a very popular, no-care landscape plant. Rabbit-resistant and evergreen with purple flowers, it is used as a dense groundcover in residential and municipal landscapes. It is also a great erosion-control plant because it will spread by rooting from its nodes if they are touching the ground. Additionally, planting local natives supports local fau-



na—especially insects—as plants and animals in the same area have evolved to depend on each other for survival. Herbariums (plant libraries) have *D. greggii* specimens collected from the Chiricahua Mountains, Guadalupe Canyon (by Douglas), and southwest of Bowie.

Ever enthusiastic about trying other daleas, I am giving the Chihuahuan Desert native, *Dalea frutescens*, Black Dalea a try. It is a low-growing woody shrub, not dense like the Trailing Indigo bush but provides a light, spreading cover for the natural zone in a landscape.

Yet, I yearn for another dalea species in my yard. While walking behind my house in the Mule Mountains, I came across a plant I hadn't noticed before, the "oakwoods prairie clover", Dalea versicolor (probably var. sessilis). In the University of Arizona Herbarium, there are 29 species of daleas collected from Cochise County, six of which are found in the Mule Mountains. The D. versicolor is one of the showier Mule Mountain woody species with purple and yellow flowers-and I found it in the oak woods! Not quite sure how "prairie clover" ended up as part of the common name, but I do know, according to the SEINet botanical website, the Dalea genus is named in recognition of Samuel Dale (1659-

> 1739), a physician, botanist, and medicinal plant expert. Now that makes sense and should help you remember to say "day-lee-ah" instead of "dah-lee-ah"!

Cado Daily, Guest Author Water Resources Coordinator, Water Wise Program – Retired! University of Arizona Cochise Co Cooperative Extension

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The Magnificent MG Class of 2017

I hate to keep bragging, but we had ANOTHER wonderful group of Master Gardener Students graduate on May 17. Twenty-two of them, to be exact. They made history in three ways. First, this was the largest graduating class since 2012. Second, their weekly attendance rate was the best ever, especially since several of the students traveled each week from distances such as Bisbee, Patagonia, and even Sunsites! That's a lot of dedication for sixteen weeks!

And third, and most important and impressive, these students collectively completed more volunteer hours BEFORE graduation than any previous group. In fact, we had six new grads complete their FIFTY volunteer hours for certification before they even completed the MG class.

As always, the group was a diverse mix of gardeners—folks who had just moved to Arizona and folks who'd been longtime residents. There were folks who had grown bountiful gardens for years, and then those who had barely touched a shovel. We even

had two experienced Master Gardeners from other places join us. Jolene McGowen from the Dallas-Ft. Worth area, and Cal Kelley from Yuma, both re-located here and signed on to take the Cochise County Master Gardener class series.

This class was engaged and enthusiastic. Not only did they exude positive energy in class, but they jumped on board for multiple projects such as working on the High Desert Conference, the Spring Plant Sale, and working for the Discovery Gardens.

Happy Congrats to Gerald Brown, MaryAnn Capehart, Scott Culp, Ralph Engebretsen, Ed Faux, Mark Grams, Malcolm Hamilton, John Harris, Mary "Gigi" Haynes, Beth Hester, Cal Kelley, Gisa Kruger, Linda Lawson, Melanie McCaleb, Jolene McGowen, Jim Murphy, Elizabeth Riordon, BJ Searcy, Janet Sherwood, Sue Wolhart, Rita Yauger, and Pablo Zamora. I will truly miss being with this amazing group every Wednesday!

Jan Groth, Master Gardener Program Coordinator



Spring Plant Sale

The Plant Talk began at 8:45 AM and was presented by Jan Groth on the care and growing information on the 96 varieties of native and desert adapted plants we offered at the Sale. More than 85 people attended this talk where they could ask questions and learn special features of gardening in our high desert.

Then, the Plant Sale began at 10:00. We kept the sale area roped off until the talk was complete, as it would not be fair to the talk attendees to allow for early shoppers. But-at 10:00 the rope came down, and it was a bit like the Kentucky Derby of Plant Sale shopping! The numerous enthusiastic garden shoppers literally dashed for their favorite blooming perennials, shrubs, vines, trees, cacti & succulents, fruit trees, and groundcovers. Master Gardener volunteers were on hand to answer questions and help carry plants to Donna & Cliff Blackburn who, as always, so lovingly accepted payments!

As with all big projects, it takes a great many dedicated, energetic folks to produce the Spring Plant Sale. Heartfelt thanks to Jody Sharp Webb, BJ Searcy, Linda Lawson, Scott Culp, Jolene McGowen, Mary Jackson, Melanie McCaleb, John Harris, Debbie Switzer, Mark Woods, Gigi Haynes, Cal Kelley, Janet Sherwood, Beth Hester, Donna Blackburn, Cliff Blackburn, JoAnne Ehasz, Malcolm Hamilton, Mark Grams, Pablo Zamora, Gerald Brown, Evie Van de Bogart, Rita Yauger, Gail Westmoreland, Ed Faux, Elizabeth Riordon, and MaryAnn Capehart. What a great group to work with!!! Like a fine-tuned engine!!!

We are deeply and genuinely grateful to all the patrons of our Master Gardener Plant Sale—first, because all proceeds go to the continued development of our educational demonstration gardens called the Discovery Gardens at UA Sierra Vista, and second, because the GESTURES of support from all the patrons of the Plant Sale truly mean so much to the Cochise County Master Gardener Association. Thank you all!

Jan Groth, Master Gardener Program Coordinator