



## The Virtual Gardener—What is Master Gardening? Part 1: The Cooperative Extension

I have been a Cooperative Extension Master Gardener since 1993 and it disturbs me when I talk to people and find out they have never heard of either the Master Gardener Program or the Cooperative Extension. This month and next, I would like to do two things: provide a little background information on both of these services so that you have a basic understanding of them and enlist your support in spreading the word about them.

The Cooperative Extension Program is a completely American innovation. Believe it or not, it traces its origins to before the Civil War. At that time education in the United States was dominated by colleges and universities that focused on classical education. The country was rapidly expanding westward, and the skills needed by the settlers moving west were practical ones, not the ones taught in the colleges and universities of the time. A movement began to create a publically-funded system of “industrial” education that would be more suited to practical needs.

Bills were first submitted to Congress in 1857 to create a system of “land-grant” colleges to fill the need for practical education. Although the bill passed Congress, it was vetoed by President Buchanan. The bill—subsequently known

as the Morrill Act after Representative Justin Smith Morrill of Vermont, its sponsor—was re-introduced in 1861 and again passed by Congress. President Lincoln signed it into law in 1862. Under the Morrill Act, states and territories received land to be used to establish educational institutions that would teach practical skills related to agriculture and the “mechanic” arts (*i.e.*, engineering). One of the land-grant institutions created under the Morrill Act was the University of Arizona, established in 1885, 27 years before Arizona became a state.

The importance of training in agriculture and other practical skills became even more important with the enactment of the Homestead Acts of 1862. The offer of free land to those who would occupy it, improve it, and farm it produced a flood of settlers moving west. Many of these settlers had no experience as farmers or had farmed in regions with completely different climates, and they struggled to survive. The Morrill Act provided the schools to teach farming and other skills to these homesteaders.

In 1887, Congress passed the Hatch Act (named for Representative William Hatch of Missouri) that provided funding for

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COLLEGE OF AGRICULTURE  
AND LIFE SCIENCES  
COOPERATIVE EXTENSION  
Cochise County

### Cochise County Cooperative Extension

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agricultural experiment stations to be associated with each of the land-grant schools. The purpose of these stations was to provide research-based information to support local agriculture and to provide information to be incorporated into the curricula of their schools. The University of Arizona established an agricultural experiment station, the *Mesa Farm*, near Mesa in 1914.

Although a step in the right direction, the land-grant schools and experiment stations were still not the best solution to the problem. They required farmers to come to them, but farmers are busy people and do not usually have the time to travel to a university or experiment station to learn new skills and techniques. The solution would be to take the universities to the farmers. This was accomplished through the Smith-Lever Act of 1914 (named for senators Hoke Smith of Georgia and Asbury Lever of South Carolina) that established the Cooperative Extension system and was signed into law by President Wilson in 1914.

Next month we will learn more about the Cooperative Extension and see how the creation of the system led to the establishment of the Master Gardener Program.

Until next time, happy surfing!

Gary Gruenhagen, Master Gardener  
[virtualgardener@cox.net](mailto:virtualgardener@cox.net)



# April Reminders

**Stake new trees**  
**Fertilize**  
**Prepare for pests**

## Cuttings 'N' Clippings

✿ CCMGA monthly meeting April 14, 2:00—4:00 PM Room 503 UASV. The topic will be *Subsidence and Earth Fissures in Cochise County*.

✿ **Plant Sale!!! Saturday, April 23**  
**See article below!**

For more information go to the Cochise County Master Gardeners web site at:

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

Or contact Valerie at:

[valeriedavidson@email.arizona.edu](mailto:valeriedavidson@email.arizona.edu)

You can also follow them on Facebook at:

[www.Facebook.com/CochiseCountyMasterGardeners](http://www.Facebook.com/CochiseCountyMasterGardeners)

✿ The Master Gardeners are at the Sierra Vista Farmers Market on the **first Thursday of each month** to answer questions and offer resources for common garden and landscape problems.

### WAM! April is

### Water Awareness Month!

Rainwater harvesting has been practiced for thousands of years but only recently has its use been cultivated in the United States. Join Water Wise to learn the basics of how to harvest rain at your home.

✿ **Clinic 1—Saturday, April 2 from 9:30—11:00 AM** at the CAL Ranch Store, 673 N. Hwy 90 in Sierra Vista.

**Clinic 2—Saturday, April 16, 9:30—11:00 AM** at The Home Depot, 3500 Avenida Cochise, Sierra Vista.

**Clinic 3—Saturday, April 16, 1:00—2:30 PM** at Lowes Home Improvement, 3700 MLK Jr. Pkwy, Sierra Vista. All clinics will be presented by UA Extension specialist Steve Poe, Ph.D. Check out the Water Wise web site to see what else is happening in 2016 at:

<http://waterwise.arizona.edu/>

✿ The Cochise Chapter of the Arizona Native Plant Society holds monthly programs in the Cochise County Community Development Office Conference Room, 4001 Foothills Dr. (corner of Highway 92 and Foothills), Sierra Vista at **5:00 PM**. On **April 15**, the speaker will be Sue Carnahan, botanist, on *A Flora of Salero Ranch, Santa Cruz County*. She is an active contributor to the Plant Atlas Project of Arizona (PAPAZ). Sue discovered botany in the spring of 2009 while hiking and photographing on the Salero Ranch in Santa Cruz County. The ranch has water, complex topography, and a very nice assortment of microhabitats. She will share her current work on the flora of this wonderfully diverse area on the south face of the Santa Rita Mountains.

## 2<sup>nd</sup> Annual Spring Plant Sale

Ready, Set, Get Planting! The 2<sup>nd</sup> Annual Cochise County Master Gardener Spring Plant Sale is set for Saturday, April 23 at the University of Arizona Sierra Vista Campus. A talk will begin at 9:00am in the Public Meeting Room in Groth Hall on the growth characteristics of each of the native and desert adapted plants for sale. The plant sale will begin at 10:00am on the shaded, front, north patio right outside the Public Meeting Room and continue through 2:00pm.

All proceeds from the Master Gardener Plant Sale will benefit the Discovery Gardens at the U of A Sierra Vista, which are demonstration gardens being developed by the Cochise County Master Gardeners in conjunction with the Cooperative Extension Cochise County. The Discovery Gardens will feature several theme gardens with pollinator habitats running throughout, hardscape, soil erosion control, rainwater harvesting, and other concepts to motivate and inform garden visitors for their own homes.

An added bonus? The Sierra Vista Area Gardeners Club will also be there selling their veggies, houseplants, and cacti! Come See Us!

# Ready, Set... Grow!

You have just arrived home from a daylong excursion to your favorite nursery with a bounty of flowers and vegetables to plant in the garden. Along with your love and green thumb, you probably spent enough money at the nursery to keep them in business for the rest of the season, too! I understand! We get excited and often overspend with our passion for growing. So now, looking over your beauties planted in their new home, you make an oath to each of them that you will give them whatever they need to protect them, help them thrive, and discourage any damage that may come from lurking insects or disease.

The single most important act a gardener can take to do this is to be sure that their plants (both new and old) are given the right amount of plant mineral nutrition. Yes, that's right! With the right balance and sources of minerals for the tenderlings, you are taking the primary step to protecting them from attack by insects and disease. Just as we keep our own bodies healthy and at their optimum in order to protect us from illness, we must do the same for our plants. Easy does it though, one can give too much fertilizer and have similar affect in attracting the pests and disease, or cause injury.

| Recommended 'Broadcast' fertilizers per 1000 sq. ft.* |           |                              |
|-------------------------------------------------------|-----------|------------------------------|
| N                                                     | 4-8 lbs.  | ammonium sulfate (21-0-0) OR |
|                                                       | 5-10 lbs  | ammonium phosphate (16-20-0) |
| P                                                     | 4-8 lbs.  | triple superphosphate        |
|                                                       | 5-10 lbs. | ammonium phosphate (16-10-0) |

\* use lower rates if soil test levels are 'high' or above.

**Table 1**

We all know that healthy plants come from healthy soil, so this would be our primary concern prior to and even during the growing season. However, in most Arizona soils, even in those that are properly managed, there is need to give plants some added inputs of nutrients that become depleted because the plants require them in large quantities. Most often these nutrients are nitrogen and phosphorous (macronutrients). But, always be aware of other nutrient deficiency symptoms so if you spot it you can hopefully correct it in time. After all, it is not uncommon to see iron (micronutrient) deficiency in Arizona too! For new transplants or planted seeds the following table from our very own University of Arizona Tom

DeGomez (<http://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/az1020.pdf>) can be used for determining the amount to apply; however, this is for commercial pre-mixed broadcast fertilizer. So, apply 1/3 of this in a thin band to the side of the seed or transplant, and the other 2/3 is broadcast.

| Fertilizer              | Nitrogen (%) | Phosphorous (% P2O5 ) | Potassium (%K2O) |
|-------------------------|--------------|-----------------------|------------------|
| Blood, feather meal     | 12           | 0                     | 0                |
| Fish meal or powder     | 10-11        | 6                     | 2                |
| Bird and bat guano      | 9-12         | 3-8                   | 1-2              |
| Meat and bone meal      | 8            | 5                     | 1                |
| Soybean meal            | 7            | 2                     | 1                |
| Pelleted chicken manure | 2-1          | 1.5                   | 1.5              |
| Bone meal               | 2            | 15                    | 0                |
| kelp                    | <1           | 0                     | 4                |
| Soft rock phosphate     | 0            | 15-30                 | 0                |

**Table 2**

There are also organic forms of fertilizer we can use for the extra input of nitrogen and phosphorous. Most times these are in the form of manure. With manure though comes some variability. Manures and other organic fertilizers contain different amounts of nitrogen and phosphorous. Table 2 is from another of our University of Arizona specialists, Dr. Ursula Schuch, which shows the differences of macronutrient concentrations in some of the commercially available organic fertilizers we have available to us.

Most times when you select a pre-mixed fertilizer it contains percentages of a multiple of nutrients including macronutrients (*i.e.* N-P-K) and micronutrients (*i.e.* S-Fe-Zn), but maybe you only need to correct the phosphorous concentration without adding any more nitrogen. So how do you calculate how much to apply? And on top of that, the question most often remains, how much of that particular chemical element is actually in the amount you're applying? Well, my plant kingdom friends, there are conversions for that. The following table (Table 3) helps you convert any pre-mixed fertilizer, even if it's a 0-15-0 or a 20-0-0, and determine how many milligrams to apply for particular parts per million (ppm), and vice-versa. Notice the conversion factors are in the formula for each element.

Or, if you like to use some of the online conversion calculators, here is a link to a good one I've found that helps you determine the amount of a particular fertilizer to

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apply based on the size of the area you applying it to. It is real easy to use with drop down menus of even specific fertilizer chemistries and the amount of area you need to apply nutrients to. Here is the link from the University of Kentucky, [http://soils.rs.uky.edu/calculators/mult\\_fert.asp](http://soils.rs.uky.edu/calculators/mult_fert.asp).

#### Using Premixed Fertilizers

|                                          |                                                                                                    |
|------------------------------------------|----------------------------------------------------------------------------------------------------|
| 1) mg of mixed fertilizer/liter of water | = $\frac{(\text{ppm of N desired}) (100)}{(\% \text{ N in fertilizer})}$                           |
| 2) ppm of P                              | = $\frac{(\text{mg of mixed fertilizer/liter of water}) (\% \text{ P}_2\text{O}_5) (0.4366)}{100}$ |
| 3) ppm of K                              | = $\frac{(\text{mg of mixed fertilizer/liter of water}) (\% \text{ K}_2\text{O}) (0.8301)}{100}$   |
| 4) mg of mixed fertilizer/liter of water | = $\frac{(\text{ppm of P desired}) (100)}{(\% \text{ P}_2\text{O}_5) (0.4366)}$                    |
| 5) mg of mixed fertilizer/liter of water | = $\frac{(\text{ppm of K desired}) (100)}{(\% \text{ K}_2\text{O}) (0.8301)}$                      |
| 6) mg of mixed fertilizer/liter of water | = $\frac{(\text{mg of mixed fertilizer/liter of water}) (\% \text{ N})}{10}$                       |

**Table 3**

Whatever you decide to use to protect your investment in plants and vegetables, keep in mind that organic fertilizers typically break down at a slower rate than synthetic fertilizers, which are more readily available right after application. The organics can even be thought of as slow-release fertilizers, supplying a small but steady supply of nutrients to your plant world as they are broken down. Happy gardening friends and remember if you maintain optimum health of your plants they are less likely to be noticed by those lurking pests and disease, but don't overdo it!

*Joshua Sherman, M.S.,  
Commercial Horticulture Area Agent*

### High Desert Gardening & Landscaping Conference Was Glorious!

The 23<sup>rd</sup> Annual High Desert Gardening & Landscaping Conference took place on March 10 & 11, 2016 on the Cochise College Campus in Sierra Vista. It was a buzzing place with more than 115 attendees and vendors from all over Arizona, New Mexico, Texas, Hermosillo, Mexico, and even one attendee from Washington State!

We had a really wonderful group of speakers this year. Our keynote speaker on Thursday was Margaret West, landscape architect and owner of Margaret West Designs of Tucson. Winner of 30 different awards for her work, 3 of them national, Margaret shared numerous stories and pictures of her designs showing hardscape, patio structures and design, pathways, and plantings. She was so motivational, answering questions and giving more ideas for 20 additional minutes after her talk! We all wanted more.

Keynote speaker on Friday was Tony McCammon, Extension Educator from the University of Idaho. Tony not only teaches on several diverse topics in the Extension, but is also known as "The Plant Whisperer" there. He held a captive audience as he spoke on "How Plants Think" as he discussed scientific experiments and observations on plants' reactions to sound, emotion, touch, and other stimulations. Tony spoke later that afternoon to a full room on growing fruit trees. Several written evaluations from attendees after the conference said

"Bring the Plant Whisperer Back!" Fascinating man, and a nice gentleman as well.

Jeff Grass from Mountain States Nursery brought a collection of their newest cultivars on the market to include 'Brakelights' Red Yucca, 'Pam's Pink' Honeysuckle, and 'Pink Parade', which is a new cross between *Hesperaloe parviflora* (Red Yucca) and *Hesperaloe funifera* (Giant Hesperaloe). Jeff got folks excited about how to use all the new plants in their landscapes, and then did one better . . . he donated all his plants for door prizes!!

This year's conference offered several hands-on workshops. We heard back from folks that they really enjoyed creating hypertufa containers with Kunie Kummer and Karen Webb. It's fun getting your hands in the concrete mud! Another group learned about the concept of vertical gardens for agricultural and decorative uses, and each left the class with a miniature vertical garden they created with succulents. A third group learned about canning their bountiful harvest and left the class with samples provided by Hope Wilson from Yavapai County Extension. A fourth group worked on propagation of cacti & succulents with Jeff Moore of Arid Adaptations, a newer cactus nursery in Tucson. The fifth group left their workshop fat and sassy, after cooking with Jim Hastings, The Gringo Gourmet from El Paso, Texas. Jim did demonstrations and tastings with his Southwest cooking, specializing in cactus pad preparation. Folks just loved Jim and all the fun things he taught.

Breakout sessions were offered throughout both days from a diversity of speakers from Arizona and Texas. Toni Moore from Tucson had people excitedly leaving her Water Gardening talk with plans to go home that evening to prep for their new water gardens. Cado Daily inspired several gardeners to start a new straw bale garden. Karen LeMay of Pollinator Corridors SW taught us how to identify our backyard birds and offer proper habitat for them. Kief Manning of Kief Joshua Vineyards gave us knowledge in growing our backyard grapes. Doc Stalker from the Rose Gardens in El Paso got his class excited about growing roses in the High Desert. Josh Sherman, our own Cochise County Horticulture Agent, taught us how to give ourselves botanical names based on our own characteristics . . . a fun exercise!

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## At a Glance Box

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

**Plant:** Arizona orange, Star-leaf, *Choisya dumosa* var. *arizonica*

**Description:** Flowering woody shrub

**Blooms:** White flowers resembling and smelling like orange blossoms.

Spring.

**Water Need:** No supplemental

**Use:** Landscape plant under the right conditions

**Culture:** Shallow soils, rocky slopes, canyon shade, 3,000 – 5,500' elevation.

**Learn more:** Cochise County Herbarium, [www.cochisecountyherbarium.org](http://www.cochisecountyherbarium.org).

For help with any local native plant identification, please visit the Plant ID link on the Herbarium website.

For an in-depth article, see below.

*Cado Daily, Guest Author*

*Water Resources Coordinator, Water Wise Program – Retired!*

*University of Arizona Cochise County Cooperative Extension*

## Arizona orange

You know how you can walk past something a million times and never see it? While taking my regular morning walk up a canyon in the Mule Mountains last year in mid-April, I ran into another walker who asked me what the bush was with the white flowers. Hum, I thought, bush...white flowers...blooming. No clue. I had walked by not just one bush, but a cluster of them for about 20 years and never saw them! Rather humbling, but not to be defeated, I took pictures and samples, did some research and learned it was Arizona orange, Star-leaf, *Choisya* (CHOY see-ah) *dumosa* var. *arizonica*.

What a lovely plant and in the right location, one with great landscape potential. Like citrus plants, *Choisya* is in the *Rue* family and has some of the same wonderful characteristics.

Arizona orange is evergreen with pretty 5-petaled white flowers blooming April through July that look and smell like orange blossoms (as aptly described by one of its common names). The shrub is delicately woody and grows about 3-6 feet high and 2-3 feet wide. The many palmate leaves with five 1-inch long, very narrow leaflets give the plant an oriental look as well as one of its other common names, Star-leaf. When crushed, the leaves are also aromatic.



The Mule Mountain *Choisya* population that I overlooked for many years grows on a steep, thin soil, north-facing rocky slope protected by the shade of Emory and Mexican blue oak trees (*Quercus emoryi* and *Q. oblongifolia*), and large Evergreen sumac (*Rhus virens*) shrubs. There is such a large population of plants growing in that one area that it almost looks like they propagate by underground runners (rhizomes). A literature search didn't mention that growth habit so perhaps the growing conditions under the oaks is a perfect spot for seed germination. I also recently saw a few *Choisya* in the Dragoon Mountains in the crevices between large boulders. Again, a shady spot with shallow soils. A web reference noted that the roots are shallow which makes sense given their natural habitat in thin soils (several plants looked like they were growing on rocks). This may be why a shady spot for them is important for root protection from hot sun.

As for availability of *Choisya* for planting in native landscapes, I found one website (Plant Delights) out of N. Carolina that sells *Choisya* species, but I like to support our local growers. I also think locally grown native plants adapt easier to their new home when transplanting. So I called my good friend Peter Gierlach A.K.A. Petey Mesquitey, a local specialty grower and owner of Spadefoot Nursery. "Oh!" he cooed, "What a great plant! Used to grow it from seed...a bit touchy, but humm, maybe I'll get some going for selling in

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(Arizona orange continued from page 5 the fall.” If he does, I will be first in line. (He can be found at the Bisbee Farmer’s Market on Saturday mornings and at [spadefootnursery@gmail.com](mailto:spadefootnursery@gmail.com)). In the meantime, perhaps when taking a hike in our local mountains this spring you will see (or smell!) some of these beauties in bloom, but a bit of advice from one who knows, don’t forget to look up!

*Cado Daily*, Guest Author  
Water Resources Coordinator,  
Water Wise Program – Retired!  
University of Arizona Cochise  
County

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Rick Gibson, Extension Agent from Pinal County, gave two wonderfully educational talks on raised beds and diagnosing plant problems. Our own Master Gardener, Julie Barton, inspired folks to successfully raise tomatoes and corn in small spaces. Dr. Deb Young was successful in getting a full audience to think about their approach to integrated pest management. Peter Gierlach, lovingly known as Petey Mesquitey, excited his full audience as always, with his passion for Native Arizona and his stories about plants and animals from the Borderlands. Jim Koweek ended our 2-day conference

with a talk on Grassland Plant ID, and excerpts from his new book *Grassland Plant ID for Everyone—Except Folks Who Take Boring Technical Stuff Too Seriously*.

Many people commented that it was the best conference ever. To all of you who attended and to those who worked on the conference . . . a genuine thank you . . . for all of the positive energy given to make those two days a delightful, educational, inspiring experience. Watch for next year’s conference, March 9 & 10, 2017. See you there!

*Jan Groth, Master Gardener Program  
Coordinator*

## High on the Desert

The 23<sup>rd</sup> Annual High Desert Gardening & Landscaping Conference is history. There were many memorable moments, new friends made, and lots of information made available! If you would like to relive some of the highlights, take a few minutes and watch this video. [Click here.](#)

The 24th Annual conference will be held March 9 & 10, 2017!

*Carolyn Gruenhagen,, Master Gardener*



Susan Pater, Cochise County  
Cooperative Extension Director  
Photo by Bob Gent



Jan Groth, Cochise County  
Master Gardener Program  
Coordinator  
Photo: Deb DiBiasie



Josh Sherman, Cochise County  
Horticulture Agent  
Photo: Deb DiBiasie

*"Out of gardens grow fleeting flowers  
but lasting friendships"*

Cochise County Master  
Gardener Newsletter Editor  
Carolyn Gruenhagen

- Beverly Rose Hopper