Vol. 26, No. 7 July 2015

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

# The Virtual Gardener—Gardening for Geeks

Whether we love it or hate it, there is no denying that the internet has had a major impact on us. We use it to communicate with each other, to keep ourselves informed/entertained, and even to go shopping. It has both simplified and complicated our lives.

Now a new internet wave—a tsunami, actually-is crashing down upon us. It is the so-called internet of things (IoT), a network of smart devices ("things") embedded with electronics, software, sensors and connectivity that enable them to talk to each other, to computers, and to people, and in many cases to be able to make decisions and take autonomous actions. Soon these devices will be everywhere-embedded in our appliances, our homes, our automobiles, and even in our gardens. The first of them to assist gardeners is already available or in the pipeline to soon become available. Let's see how they can help us.

To keep our plants alive and healthy, we need to provide them with suitable environments. Among other things, they need the right amount of sunlight and water, the right soil chemistry, and just the right temperatures. If these parameters stray outside acceptable limits, the plants fail to perform well and may even die. It is the job of the gardener to make sure this doesn't happen. Smart garden sensors can assist gardeners in monitoring and managing these conditions.

High on the Desert Cochise County Master Gardener Newsletter

We've always had instruments to help us monitor conditions in the garden, ranging from thermometers, to moisture meters, to devices that measure the electrical conductivity of the soil. These instruments presented us with a reading of some parameter and left it to us to figure out whether it was a good value or a bad value and what to do about it if it were bad. The new smart sensors-for want of a better name, let's call them Smart Garden Monitors (SGM)-take this a step farther. They not only measure a parameter, but in most cases store it, monitor its behavior over time, compare it with a database of plant requirements, and make recommendations for correcting a deficiency. Some can even take an action such as turning an irrigation system on or off.

In a Desert Garden 2 3 This Month in the Garden 3 Help Wanted 4 Ready. Set . . . Growl 4 Cuttings "N' Clippings 5 Bloomin' Cochise County 6 New MG Web Site 6 July Reminders

Inside this issue:

The first of these SGMs to hit the market were fairly limited in capability.

(Continued on Page 2)



## www.ag.arizona.edu/cochise/mg/

1140 N. Colombo, Sierra Vista, AZ 85635 (520) 458-8278, Ext. 2141 450 S. Haskell, Willcox, AZ 85643 (520) 384-3594



#### (Continued from page 1)

They measured only one or two parameters—usually moisture and/or temperature-and had to be physically connected to a computer to download data. The latest systems are more sophisticated, measuring more parameters. connecting wirelessly to smart phones, tablets, or other computers, accessing plant databases over the internet, and using sophisticated apps to analyze data and make plant-specific recommendations.

The latest SGMs are more capable than their predecessors but they still have a long way to go. For starters, they need to come down in price...a lot! I don't know about you, but I think spending \$50 to \$100 for a SGM to monitor a single plant or small group of plants is kind of expensive. But I'm sure the prices will come down as competition increases and the R&D costs are amortized out.

The sensors themselves need to become more sophisticated as well. Temperature, moisture, and sunlight are fairly straight forward to measure but soil chemistry is a little more complicated. The current sensors measure "fertilizer" using the electrical conductivity (EC) of the soil as a surrogate metric. EC measures the concentration of dissolved salts in the soil. Since plant nutrients occur as dissolved salts, this sounds reasonable, but not all salts are equal. Some, like sodium, can be toxic. The SGM needs to be smart enough to distinguish between different types of salts and measure the concentrations of each. It should also be able to measure soil pH. Even if nutrients are present in sufficient quantities, they may not be available to the plants if the pH is wrong. Perhaps the SGM of the future will even be able to measure plant "vitals" directly rather than relying on surrogate parameters.

As previously mentioned, the idea of using a single expensive SGM to

monitor one plant or small group of plants does not seem to be cost effective. A better solution would be to have an array of inexpensive sensors that could be scattered throughout the garden, each sending data back to a central collection point. Arrays of self-organizing networked sensors exist and are already in use in a variety of contexts such as ecological studies.

So far this technology has only barely scratched the surface of what's possible for the gardener. But we've still got a long way to go. The day has not arrived when a "brown thumb" gardener can produce a thriving garden based solely on the advice of a SGM, and it may never come. But we're moving in that direction.

If you would like to learn more about gardening monitor systems including some systems you can build for yourself—check out this <u>website</u>.

Until next time, happy surfing!

Gary Gruenhagen, Master Gardener virtualgardener@cox.net

## In a Desert Garden

#### Bear's breeches—*Acanthus mollis*

This is an unusual plant and in this part of the world I have never seen it for sale. I cannot remember how I happened to get one—it's been too long ago. These plants are native to the Mediterranean countries with mild and dry conditions. This is a shade loving plant that withers in the heat of summer when it usually goes dormant. I have it planted in the entry to my home which has an alcove. There it grows at the bottom of a star jasmine which is trained over a trellis.

Bear's breeches grows from tubers, and it forms a clump of large deep green serrated leaves almost a foot in diameter. From that huge rosette of leaves, in late spring emerges the flowering stalk, that can reach three feet. This stalk has tubular flowers that cover it on all sides. These flowers are about two inches long and surrounded by three green or purplish bracts. The calyx has two lips, the upper one forming a helmet on top of the corolla. The flower has four stamens that look like tiny brushes. These flowers can only be pollinated by large bees. It is an impressive plant. My variety is a hybrid miniature, but really, there is nothing miniature about it. The only other location here in town where I have seen this plant growing is at the Bank of America building where there are several plants that have an impressive size.

In a mild winter like the one we had, the plant keeps its leaves. In a cold one it loses them. It goes dormant and does not flower in really hot weather like we had last spring. This year, with its prolonged mild weather, it is thriving and has produced this beautiful flowering stalk (see photo). Now, as the weather is



heating up, I can see it suffer. More water really does not help as it is verv drought tolerant and prefers dry conditions. Α few years ago, I dug the plant up and to give

it more space I planted it under the large arbor of my Tombstone rose, but it didn't make it. There was just more water than it likes. I thought I had lost it, but to my surprise it came back in full force at its old location. That told me you can never really get rid of it once it is established and under the right conditions, I think, it can be invasive.

Angel Rutherford, Master Gardener Photographer (Editor's Note: This article written by Bill Schulze was adapted from a July 2011 article published in the *Sierra Vista Herald.*)

July is another hot month in the high desert garden, thankfully, though, a bit cooler than June. Continue to plant summer vegetables such as melons, cucumbers, beans, pumpkins, eggplant, okra, and summer and winter squash. You can still plant peppers and tomatoes, but it's best to buy them as plants from a nursery; don't start them from seed this late in the summer. Summer rains will lessen the need for additional watering, but continue to water during dry spells. An irrigation or drip system, plus mulch, makes this task easier and conserves water. Plant herbs, too-basil, mint, oregano, sage, chives, and thyme all do well in the heat, but avoid dill, cilantro, and parsley which prefer cooler temperatures.

Good annual flower choices include sunflowers, cosmos, vincas, marigolds, and zinnias. Continue to deadhead roses and other flowering plants to stimulate new flower growth and to remove unsightly spent blooms.

Watch all plants for signs of nutrient deficiencies. When it comes to selecting a fertilizer or mineral supplement to correct deficiencies, it's important to read and understand the label on the box or bag. Fertilizers, whether organic or synthetic, are required



by law to include the percentages, by weight, of nitrogen, phosphorus and potassium (N, P, and K, respectively, the

"big three" plant nutrients). So, when you look at the label, you'll see three numbers prominently displayed, 16-16-16, 21-0-0 maybe or (ammonium sulfate), or 16-20-0 (ammonium phosphate). These three numbers refer, in order, to the amount of nitrogen, phosphorus, and potassium contained in the fertilizer. A zero means, of course, that the fertilizer contains none of that particular constituent. The point being, of course, don't buy ammonium sulfate (with a second number of zero) to correct a phosphorus deficiency! Cochise County soils normally contain plenty of potassium, but are typically lacking in nitrogen and sometimes in phosphorus. Some fertilizers also contain additional minerals like manganese, magnesium, and copper and these additional constituents will be listed on the container. For iron deficiency (chlorosis) buy iron chelate. The chelated form makes the iron more readily available to the plant. Pecan trees often suffer from a zinc deficiency in our soils, showing symptoms like small leaves, rosetting (whorls of small leaves at the branch tip), and brown spots. The remedy for this is a foliar application of zinc sulfate. Zinc absorption is enhanced by spraying the leaves with a mixture of two heaping tablespoons of ammonium sulfate with two heaping tablespoons of zinc sulfate in a gallon of water.

It's important when using fertilizers, pesticides, or herbicides to follow the directions on the label precisely. It is against federal law to apply pesticides or herbicides other than in accordance with the label. Don't mix products in the same container or application. The preceding example that mixes zinc sulfate and ammonium phosphate is a rare exception that has been well studied and recommended by no less an authority than the University of Arizona Cooperative Extension. Realize that over-application of fertilizers can kill plants. Excess nitrogen to a slightly lesser degree will result in lush growth, so you'll have tomato plants that look gorgeous, but that don't flower and don't produce fruit --and a beautiful tomato plant with no 'maters ain't worth much in my book!

Bill Schulze, Master Gardener

## **Help Wanted**

Volunteers for the Cochise County Herbarium have been busy identifving plants we haven't seen in years, and would like to share what we've discovered with others who are interested in non-cultivated plants in the area. We encourage anyone who has questions about the identities of these plants to send photographs or preserved specimens to us. Photographs should include flowers, fruits if available, leaf structure and arrangement, and growth habit (e.g., herb, shrub, tree). Preserved specimens of flowers, fruits, and leaves should be pressed in newspaper or other comparable material under a flat, heavy object such as a book or board. Pressed plants that have a significant water content should have layers of cardboard above and below while drying to inhibit mold growth. Please record the following information about the collected plant: date collected and specific location including approximate elevation and surrounding vegetation.

Email photos to Mimi Kamp at jumi@theriver.com or drop off your pressed specimens at the UA Cooperative Extension Office, M-F, 8:00 AM - 5:00 PM (closed for lunch from 12 - 1:00 PM).



As many of you know it is not recommended to plant things in the month of June, especially transplants because of having the hottest temperatures and plants really have a hard time surviving if planted now.

However, I wanted to introduce (or remind you) of Stachys affinis or better known as the Chinese artichoke. I am unsure if any of you have had success growing this little garden delight, but I would love to hear about it if so. Stachys affinis, also known as Crosne (pronounced "crone") is a member of the Lamiaceae family (mint) originating from China and is a perennial herbaceous plant that spreads by rhizomes that can be eaten as a root vegetable. They do have a look to them that resembles grub worms but don't let that discourage your efforts, Place the tubers in the top 2-3 inches of soil in a place where they will receive sun but afternoon shade for our desert. They can be used in salads or even served as the main ingredient for a side dish, like with peas or asparagus. The taste resembles water chestnuts with a crunchy texture and earthy flavor. Word of



caution, however, if you decide to add these beauties expect them to stay around a bit as you know the mint family can be a bit aggressive in their spreading nature when in the right location. Also, the rhizomes are what you harvest so they take a little more cleaning just like other root vegetables. You will not want it to go to flower as this will change the taste to more bitter in flavor.

On another note, I am sure we have all heard of All-America Selections (AAS). I wanted to take a minute to make sure all our readers have also heard of some of the latest and newest varieties approved and released by this organization. I will not have the space actually to go through all of them here, but I will touch on three of the most popular that would be suitable for our growing area and leave you with the link to visit their website.

First, there is the 2015 winner twotone Bossa Nova zucchini. It has beautiful markings, is disease resistant, and produces fruit three weeks longer than other summer squash according to AAS. Secondly, the Chef's Choice orange (last year's winner) and Chef's Choice pink (this year's winner) beefsteak tomatoes that are great for hamburger slices or for canning. And last but certainly not least, the Dolce Fresca basil, which is a dense but compact basil that is perfect for container gardening.

These new varieties have undergone extensive testing before they are entitled as "winners." If you would like to know more about AAS and other winners from this year and previous years visit:

<u>all-americaselections.org</u>. Happy gardening, friends!

Joshua Sherman, M.S. Commercial Horticulture Area Agent



#### **Cuttings 'N' Clippings**

The Cochise County Master Gardeners have changed their meeting schedule. They now meet on the second Thursday of the month, from 2:00—4:00 PM in the Public Meeting Room (PMR) of the University of Arizona South. Check the web site for the next scheduled event or contact Valerie at:

valeriedavidson@email.arizona.edu

✤ The Master Gardeners have returned to the Sierra Vista Farmers Market on the first Thursday of each month.

The next free Water Wise presentation will be Tuesday, July 7 from 5:30—7:00 PM in the Copper Queen Library in Old Bisbee. The topic will be *What is That Plant?* by Cado Daily.

On July 11 from 8:00— 11:00AM there will be a *Sierra Vista Rainwater Talk & Tour*. Meet at the University of Arizona South PMR—tour to follow. And on July 18 there will be a *Bisbee Rainwater Talk & Tour* from 8:00—11:00 AM. Registration is required for both talks. Check the Water Wise 2015 schedule on their web site:

#### waterwise.arizona.edu

For more information and registration contact Valerie at: valeriedavidson@email.arizona.edu

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

"Spanish Bayonet" and "Our Lord's Candle" are just two of the common names given to stalks of showy white flowers rising from clusters of stiff, narrow, and sharptipped yucca leaves. The blooms of our Soaptree yuccas (*Yucca elata*) in the grasslands near Sierra Vista are one of the more spectacular signs that we've had favorable conditions for growth of spring wildflowers this year.



Classified along with *Agaves* in the *Asparagaceae* family, yuccas differ from their more grounded cousins in having a large, underground caudex, a stem/root combination that stores energy and water for a genus that can tolerate hot, dry periods in the southwest. Whereas agaves have relatively shallow roots and can be easily transplanted when small, yuccas are very difficult to reposition once established, which is why we're lucky these hardy ornamentals are available in nurseries throughout the Southwest. Unlike agaves, which die after their flower stalk is produced using energy stored in their leaves, yuccas flower continuously during their lives when conditions are right.

Banana yucca or Datil (*Yucca baccata*) stays short, usually no more than three feet high, but can spread sideways with prostrate stems. It thrives in nutritionally poor soil but does not tolerate shade. With flower stalks usually shorter than 5 feet, its fruits are relatively large and fleshy.

Mohave yucca (*Yucca schidigera*) can grow up to 16 feet tall with branches. It might be mistaken for Joshua Tree (*Yucca brevifolia*) except that Joshua Tree's leaves are less than a foot long, whereas those of Mohave yucca are over 2 feet in length.

Schott's yucca or Hoary yucca (*Yucca schottii*) produces a flower stalk up to 16 feet high, and is found in canyons and on hillsides up to 7,000 feet in the Huachucas.

All of these species were important to Native Americans for a variety of uses. As suggested by the name, the Soaptree yucca provided saponins, sudsy compounds from crushed roots and trunks that served as soap for clothing and hair. The fibrous leaves provided material for weaving into sandals, mats, baskets and ropes. Needles were fashioned from the sharp tips of leaves, and flowers, fruits and young flower stalks served as food. Steroidal compounds in Mohave yucca were said to have anti-inflammatory properties.

Sometimes when we cultivate flowers for our enjoyment, or share them to brighten other people's lives, we forget that showy flowers are nature's way of ensuring species survival by inviting pollinators to promote fertilization. Yucca's scheme for getting its flowers fertilized is one of the most extreme in nature, depending on one of several related species of moths in a mutualistic relationship. Female yucca moths in the species Tegeticula or Parategeticula are adapted to fertilize a yucca by being equipped with mouthparts designed to collect and compact pollen to such an extent that they cannot eat and their adult life is short. After emerging from the ground in spring where the previous year's larvae pupated, males and females mate on yucca blossoms and the female immediately collects pollen from a flower's anthers, shaping it into a ball.

Instinct compels her to search out a flower of a different yucca, promoting cross-pollination. Before transferring the pollen to the new plant's stigma, she uses her acute (Continued on page 6)



**The Cochise County Master Gardeners are now on Facebook!** Like us at <u>www.Facebook.com/CochiseCountyMasterGardeners</u>

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Jeffrey C. Silvertooth, Associate Dean & Director, Economic Development & Extension, College of Agriculture and Life Sciences, The University of Arizona. The University of Arizona is an equal opportunity, affirmative action institution. The University does not discriminate on the basis of race, color, religion, sex, national origin, age, disability, veteran status, or sexual orientation in its programs and activities.

The information given herein is supplied with the understanding that no discrimination is intended and no endorsement by Cooperative Extension is implied. Any products, services, or organizations that are mentioned, shown, or indirectly implied in this publication do not imply endorsement by the University of Arizona.

#### PAGE 6

#### (Continued from page 5)

sense of smell to confirm that no other female moths have visited that flower. She then lavs a few eggs. just enough to nourish her young but not enough to deplete the flower's ovary. Finally, she leaves her ball of pollen on "her" flower's stigma. When the larvae are mature after feeding for a few weeks, they drop to the ground, bury themselves and prepare to pupate. Every year there are some pupae that remain dormant and overwinter twice to ensure that there will be some adults in the area in case of an inclement winter. The fact that vuccas cultivated outside their moths' range fail to produce seeds unless they're hand pollinated confirms their dependence on the moths in nature.

In addition to relying on moth pollinators, yuccas are hosts for carpenter bee larvae, whose mothers excavate chambers for their young in old yucca flower stalks. Carpenter bees



are generalists when it comes to their services, preferring a variety of large, colorful flowers in arid climates. Carpenter bees are showing promise as substitutes for non-native honeybees in servicing such crops as tomatoes and eggplants.

Virginia Bealer, Guest Author Herbarium volunteer



# Cochise County Master Gardeners NEW Web Site!!!

## Growing, Connecting, Educating... Gardening and Landscaping on the High Desert

The Cochise County Master Gardener web site has a new look. Check it out! The new URL is: <u>http://cals.arizona.edu/cochise/mg/</u>

For many months Cochise County Master Gardeners have worked with University of Arizona web developers to create a new and more modern look for the web site. The result is a site that is more attractive to look at with a more modern user interface. And there are going to be more new features rolled out over the coming months. Stay tuned.

Moving the content to the new site was a huge job. Although we tried to bring everything over, there is always a chance that something may have fallen through the crack. So if you discover something that was left out or if you have any other comments about the new site—drop a note to the County Director of Extension, Susan Pater [spater@email.arizona.edu] and let us know what you think.





- Keep the pests under control
- You can still plant something
- Keep watering!

Cochise County Master Gardener Newsletter Editor Carolyn Gruenhagen