



# High on the Desert Cochise County Master Gardener Newsletter

Vol. 19, No. 10 OCTOBER 2008

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

## The Virtual Gardener—AZMET—Some Like it Hot

The Arizona Meteorological Network (AZMET) of the University of Arizona Cooperative Extension provides meteorological data and information to agricultural and horticultural interests in southern and central Arizona.

The network was originally established with nine instrumented stations that began reporting on 1 January 1987. Over the years, 26 more stations were added, but seven of those are no longer active. Two recent additions to the network, Bowie and Kansas Settlement—

<http://ag.arizona.edu/AZMET/>

established in July 2004 and July 2006, respectively—are located in Cochise County. The data history at these two stations is short, but another station at Bonita, located just 16 miles north of Willcox in Graham county, is one of the original stations and can furnish data useful to Cochise County residents going back for more than 20 years.

The network furnishes data primarily to support commercial growers and researchers, but you will also find that information on the AZMET Web site (<http://ag.arizona.edu/AZMET/>) can help you as a gardener.

The data reported includes ambient air temperatures (max., min., mean), relative humidity (max., min., mean), dew points, solar radiation intensity, soil temperatures, wind speed and direction, evapotranspiration, and heat units. Of these, soil temperatures, heat units, and evapotranspiration data can be useful to home gardeners. Let's see how we can use them.

Most of us are familiar with the “days to maturity” printed on seed packets for the vegetables we grow. Commercial growers use a more sophisticated system based on heat units to determine when to plant and forecast the best time to harvest. They also use heat units to predict when certain types of insect pests will emerge in order to determine optimum timing for control measures.

Heat units (also known as growing degree days) as reported by AZMET are the average daily temperatures to which plants are exposed to temperatures between 86°F and 55°F (data for 86°F and 50°F and 86°F and 45°F are also reported). You can calculate degree days

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## Cochise County Cooperative Extension

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yourself using simple arithmetic (see

<http://agbiopubs.sdstate.edu/articles/ExEx8111.pdf>), but AZMET uses a more sophisticated and accurate method based on the areas under curves on a graph to calculate the values it reports.

Although we don't have enough information about the heat unit requirements for most of the vegetables we plant in our home gardens to make use of heat units like the commercial guys, we can use the AZMET heat unit data in other ways. For example, we can track how the current year is doing compared to the long-term average. This could give us a little better handle on when to plant in the spring instead of just relying on a "magic" date. Suppose I have had great luck in the past setting out my tomato seedlings around 1 May. From the Bonita data I see that the average number of heat units on 1 May is 443. Suppose I check the data for the current year and see that the actual accumulated heat units on 1 May is only 379, which is 67 units short of average. Noting that on average the number of heat units increases by about 10 each day in May, I might decide to delay setting out my transplants for about a week to allow for the accumulation of an extra 70 or so heat units.

Comparing cumulative heat units for different areas can also be useful to the gardener in this



area. We often read articles in magazines and newspapers that give recommended dates for planting seeds or setting out transplants in Tucson. Since the Low Desert around Tucson is warmer than the High Desert of Cochise County, these dates are usually too early for us. By comparing the averages for cumulative heat units in Tucson (using the Tucson station data) and here (using the Bonita, Kansas Settlement, or Bowie station data) we can get an idea of how the seasons here lag as compared to Tucson. For example, suppose it is recommended for Tucsonans to plant the seeds of a particular plant on 1 March. According to historical data from the Tucson AZMET station, the average number of heat units accumulated in Tucson by 1 March is 250 growing degree-days. If we check the historical heat unit data for Bonita, we find that, on average, 250 growing degree-days are not accumulated there until 7 April, implying that for this time of year Bonita (*i.e.*, Cochise County) is a little over a month behind Tucson. We might, therefore,

decide to wait for a month before planting those seeds here in Cochise County.

It might be useful to keep records of the accumulated heat units at the time of planting and harvesting as well as the quantity and quality of the vegetables produced in your own garden each year. That way you could build up a database that could help you plan your gardening activities for future years. Another interesting project might be to track heat units and correlate them with observed biological events such as the budding of plants, the appearance of particular insects, *etc.*

Soil temperatures are another measurement that you might find useful in planning your garden. Vegetable seeds have an optimum temperature for sprouting (see the Arizona Master Gardener Master Gardener Manual at <http://ag.arizona.edu/pubs/garden/mg/vegetable/temperature.html> for more information). Although the actual temperature of the soil is dependent on many factors—moisture, composition, sun exposure, *etc.*—you can get an idea of how the soil is warming by checking the data on the AZMET Web site. Of course you could also buy a simple probe-type cooking thermometer and check it for yourself.

Next month we'll continue this discussion, and I'll tell you how to use AZMET data to help determine the amount of water your turf grass requires.

Until next time, happy surfing.

Gary A. Gruenhagen, Master Gardener  
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*Robert E. Call*

Robert E. Call  
Extension Agent, Horticulture

Carolyn Gruenhagen  
Editor

## Cuttings 'N' Clippings

\* The next CCMGA meeting is 5:00 p.m. Thursday, October 2 at the University of Arizona South Campus Public Meeting Room.

\* The next **FREE** *WaterWise* workshop will be held at the University of Arizona South Campus Public Meeting Room on Saturday, October 4 from 9:00 to 10:30 a.m. The presentation, *Integrating and Using Gray Water*, will be given by Judy Guentzler-McCrum, American Institute of Architects and owner of Guentzler-McCrum Concept Group.

\* Thanks to all the home owners and volunteers who made the September 7 Fall Landscape Tour a success!

\* The 5th High Desert Garden Fair will be held October 18 from 8:00 a.m.—1:00 p.m. at the University of Arizona South Campus. This event is **FREE** to the public and will feature three workshops:

**8:30 a.m. De Lewis—**

*Tree Planting*

**10:00 a.m. Angel Rutherford—**

*Desert Habitat Garden through the Four Seasons*

**11:30 a.m. Jim Koweek—**

*Native Grasses, Wildflowers, and Revegetation*

Also, tour the Cochise County Herbarium and UAS Plant Science Center, browse vendors offering plants, garden equipment, arts and crafts—all things garden related. If you would like to be a vendor or for more information contact Sarah Turan at (520) 803-0718 or e-mail

[asmcran@cox.net](mailto:asmcran@cox.net).

## Garden Tip #9463

If you like cactus—I mean if you REALLY like cactus—here's a tip for you.

I usually use kitchen tongs to handle cactus but sometimes tongs are just not big enough to do the job, so what to do? My solution to the problem is a Field Expedient Cactus Handler (FECH), which you can easily make for yourself.

All you need is a short length of half-inch PVC pipe—my piece is about a 15 inches long—and a length of quarter-inch spaghetti tubing—5 feet will do nicely. The exact measurements are not critical. Now fold the length of spaghetti tubing in half and shove it down the length of PVC pipe so that there is a loop sticking out of one end of the pipe and two cut ends of spaghetti tubing sticking out of the other end. To finish the project, tie the two cut ends of the spaghetti tubing into a knot to keep it from slipping back through the pipe. *Voilà*—your FECH is complete.



Just in case you don't immediately grasp the concept of using this piece of high-tech equipment, here's how. Grab the pipe with your left (or right depending on your genetic predisposition) hand and using your right (or left) hand pull the loop end of the spaghetti tubing out of the end of the pipe as far as it will go. (This is where the knot in the end of the tubing comes in handy!) Now for the tricky part. **CAREFULLY** place the loop around the cactus you want to pick up, and firmly grasping the pipe with your left (or right) hand, snug up the loop around the cactus by pulling on the knotted end of the spaghetti tube with your right (or left hand). By maintaining the tension on the spaghetti tubing you can now use the PVC pipe as a handle to safely carry the cactus to where you want to plant it and hold it in place while you backfill the planting hole.

That's it for now. A two-man version of the FECH for handling saguaros and one with a very long handle for dealing with rattlesnakes is currently in R&D. Stay tuned.

Gary A. Gruenhagen, Master Gardener

(Reprinted from the July 2005 Cochise County Master Gardener Newsletter.)



### 2009 International Master Gardener Conference

On-line early registration is now available for the conference scheduled for March 22—26, 2009 in Las Vegas, NV. For information and video go to:

[www.unce.unr.edu/imgc](http://www.unce.unr.edu/imgc). The conference is sponsored by the Master Gardeners of Southern Nevada.



## Cacti 101: Chapter 1—Some Cactus Basics

Cacti are members of one of six large families of succulents. The botanical name, also called the scientific or Latin name, for the cactus family is Cactaceae. This family is known to contain over 2,500 species. Most cacti also have a common name. Throughout this series we shall refer to all cacti by their botanical and common name.

The full botanical name for a specific species of cactus has at least three parts; the family name, the genus name, and the species name. Some species are further divided into subspecies, usually abbreviated spp. and varieties usually abbreviated var. Subspecies and varieties are usually quite similar. Since we are only dealing with cacti we will omit Cactaceae from all botanical names.

Given over 2,500 species of cacti none of us will live long enough to get thoroughly acquainted with all of them. Rather we will begin with the genus *Opuntia* and initially on one of the two groups of *Opuntia*, those with roundish pads, commonly called prickly pear cactus.

### Propagation and Planting

Cacti can be propagated by seed but cuttings are more usual. The budding cactus grower who wants and can afford instant gratification has only one choice, the local nursery. Cacti are sold in containers as small as a cup or two up to 15 gallons and larger. Some experts recommend treating cacti sold in pots as bare root plants. They strip the plant of virtually all the container soil

and plant it in a mixture of commercial or home made cactus mix.

Handling and planting cacti can be hazardous and uncomfortable. Species with prominent spines obviously require careful handling. Tongs or other tools that help avoid direct contact with the spines are recommended. Some spineless cacti, such as *Opuntia microdasys* 'monstrous' or bunny ears look innocent but they are covered with tufts of barbed glochids. These can be very, very irritating. They are also very small and difficult to see and remove. When dealing with cacti with tufted glochids using misting and tongs is often effective in preventing the glochids from becoming air borne during handling.

Nursery cacti in large containers offer a special challenge. One way to plant such cacti directly is as follows. After digging the appropriate sized hole turn the container and cactus on its side. Cut the bottom out of the container using a tin snips or similar tool. Since nursery containers have tapered sides it is now possible to lift the container and cactus and place it in the planting hole. Once properly positioned simply cut down the side of the container with the tin snips and unwrap it from the root ball.

Cacti are desert plants that tolerate extremes of temperature and full sun. However, as they grow they develop a tolerance for direct sunlight depending on exposure. Professional cacti growers will often mark their containers to note northern exposure. When adding such plants to your own garden it is wise to maintain this exposure. If prior exposure is unknown or does not fit the new situation sun-

burn can be minimized or avoided entirely by providing some screening from direct southern sun until the plant has adapted to its new location. Landscape fabric stretched between two temporary stakes has proved effective for this purpose. Figure 1 shows sunburn on an *Opuntia robusta*, dinner plate cactus, planted as a single pad without protection from direct southern exposure.



Figure 1

The least expensive and some believe the most satisfying approach to developing a cactus garden is via direct planting of cuttings. Cuttings can usually be obtained from friends, neighbors, or other cacti growers who are pruning their gardens. As a rule most amateur cactus growers are more than happy to share their cuttings, pads in the case of *Opuntia* prickly pears.

Propagating cacti from cuttings is a simple and straight forward process. Ideally cuttings should be taken during the growing season and planted in time to benefit from the monsoon rains. A serrated, sterile blade works best, especially when taking large cut-

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## Call's Classic Comments

This column will diverge from the normal question answering format and instead feature information on one of the heroes of this Agent—Dr. Norman E. Borlaug, “Father of the Green Revolution.” Dr. Borlaug was born on a small dairy farm in northeast Iowa in 1914. He earned a Ph.D. in Plant Pathology from the University of Minnesota. After a brief stint in private industry, he began work at the International Wheat and Corn Improvement Center (CIMMYT) near Mexico City in 1944. His assigned task was to develop improved varieties of wheat, a crop he knew little about. He bred wheat and corn varieties that increased yields by two and three times when compared to other varieties. He also implemented the use of nitrogen-based fertilizers to dramatically increase plant growth. The new wheat varieties were introduced into India and Pakistan in 1963. These countries were at war and famine was common. Dr. Borlaug also introduced his plant materials and methods in Turkey, Malaysia, Burma, Indonesia, Afghanistan, Brazil, Paraguay, Kenya, Tunisia, and other countries with “wheat apostles.” These “apostles” were students that Borlaug had trained and thus multiplied his efforts.

In 1970, Dr. Borlaug was awarded the Nobel Peace Prize for his role in initiating the

“Green Revolution.” At that time the Des Moines Register stated, “The Green Revolution is likely to affect more people in a short time than any other technological change in history.” Also, “Borlaug has made a greater contribution toward the end of hunger in the world than any other living man.”

Dr. Borlaug received the World Agriculture Award September 13, 1999 at the National Association of County Agricultural Agents held in Omaha, NE. I was privileged to attend these meetings. I spoke with and shook hands with Dr. Borlaug. During his acceptance speech he spoke of the potato famine in Europe and Ireland during the 1840-60's which resulted in the immigration of millions to the Americas. More than 30 years later in 1895, Alfred Nobel died and left in his will provisions for the Nobel Prizes but did not mention agriculture. Dr. Bor-

laug tried to institute a Nobel Prize for Agriculture but was denied because Nobel did not leave provisions in his will for such a prize. However, the Nobel Prize for Economics was instituted in 1968! Dr. Borlaug commented that in a mere 30 years people had been starving but then a solution was found. Famine was forgotten by the survivors' children and grand children.

In the United States, our society thinks that food is a given; that food will always be available and cheap. We fail to remember that food production is working with biological systems. Biological organisms can and do change because of the elasticity of DNA. Constant work is needed to maintain our safe, abundant, cheap food supply! Let us count ourselves lucky to live in a country and time when most of us are not hungry, but rather many are overweight. This is not the case worldwide. Dr. Norman Borlaug, at age 85 continues to travel the world trying to defeat hunger.

*Robert E. Call  
Extension Agent, Horticulture*

*(Note: Reprinted from the October 1999 Cochise County Master Gardener Newsletter. Norman Borlaug is now 94 years old. Find more on the Green Revolution in the August 2007 Newsletter Virtual Gardener article (see our Web Site) or Google Norman Borlaug. Rob Call is currently on a University of Arizona sabbatical.)*

### October Reminders

- ◆ Be ready for the first frost
- ◆ Thin the seedlings
- ◆ Overseed lawns
- ◆ Plant spring bulbs
- ◆ Divide perennials
- ◆ Don't let weeds go to seed

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# The 5<sup>th</sup> High Desert Garden Fair

## at the University of Arizona South Campus

October 18, 2008

8:00 a.m. — 1:00 p.m.

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—tour the Cochise County Herbarium and UAS Plant Science Center—also browse vendors offering plants, garden equipment, arts & crafts—**all things garden related!**

**FREE!**

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tings. Most cactus pads need time to “heal” before being replanted. Allow the pads to rest out of direct sunlight until a “scab” or callous develops over the wound, usually two weeks or more. Healthy cuttings have been known to survive for months prior to replanting. Some experts recommend using a synthetic rooting compound but the author has found that *Opuntia* root just fine without rooting compound. When you are ready to plant, dig a planting hole deep enough to bury at least half of the cutting, wound side down. Once the cutting is in the ground a single dose of water to settle the soil is the last step in the process. A single

healthy pad planted in native soil will often develop branch pads within two or three weeks. The sunburned *Opuntia robusta* shown in Figure 1 was planted from a single pad approximately eight weeks prior to the picture being taken. Figure 2 shows a similar *Opuntia robusta* two years after planting a single pad.

Cuttings can also develop sunburn if their exposure is changed during planting. Since it is extremely hard to establish or maintain correct exposure with cuttings the author recommends using temporary screening or planting the pad so that the flat sides of the pad face east and west thus minimizing direct southern exposure on any broad flat surfaces.

*Doug Templeman, Master Gardener*



**Figure 2**