High on the Desert Cochise County Master Gardener Newsletter

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

Garden Basics: Introduction to Gardening in Cochise County and Ft. Huachuca

Local Climate

- Cochise County receives an average of 15" of rainfall a year, occurring mainly during the months of July-September.
- Average annual snowfall is 7".
- Humidity is generally very low (less than 15%).
- Average daily maximum temperature ranges from 58.7°F in January to 90.7°F in June.
- Due to the area's higher elevation and dry climate, there will typically be 25-30°F variation between the daytime high and evening low.

What does this information mean to you?

Due to the limited rainfall our native soils are **alkaline.** The relative acidity or alkalinity of soils is expressed as pH, which is a measure of the relative number of free hydrogen ions. The pH scale goes from 1 through 14, with 1 being the most acid and 14 being most alkaline and 7 being neutral. Each number represents a tenfold change in acidity or alkalinity. For example, a soil with the pH of 9 is ten times more alkaline than one with a pH of 8. Generally, soils are acidic where it receives more than 20 inches of rainfall in a year. In areas with less than 20 inches of rainfall per year, such as the lower elevations of Cochise County, the soils are alkaline. This is due to the calcium carbonate that is not leached through the soil because of our limited rainfall. In addition, Arizona soils contain very low levels of **nitrogen** (a *macronutrient* needed by plants in order to thrive**)** and **organic matter** (the remains of plants and animals).

This is why you want to garden with native and adapted plants!

From the gardener's perspective, the best reason for landscaping with native and non-native adapted plants is that they require much less care and maintenance than most exotics. *Adapted* plants are plants found in other parts of the world that have similar climate conditions. A *native* plant is a plant native to the

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southwestern United States and northern Mexico. Most of the non-native plants that people attempt to grow are just not adapted to our soils and climate. Plants that are not accustomed to high temperatures, low humidity, and alkaline soils struggle in our climate. This means that the gardener is constantly fighting with nature to keep the plants alive. Native plants have chosen this area to grow in because they like the local environment. They thrive in alkaline soils and have developed mechanisms to deal with the heat and dryness.

Now that you know our native soils are alkaline and lacking in organic matter, how can you use this information?
Although our soils are lacking in organic matter, when planting native and adapted plants, you generally do not need to add soil amendments such as manure, fertilizer, and compost. Adding organic material changes the soil structure from the surrounding native soil. Research shows that roots within a planting hole where organic material has been added will circle around within the hole rather than venture out into the surrounding soil. Organic material is best used as mulch on top of the soil around plants. Mulch will help to conserve moisture, moderate soil temperature, reduce weeds, and over time provide nutrients to the plant, such as nitrogen.

When should you add organic material to the soil?
Add to improve the soil for specific reasons, such as adding compost to the vegetable garden, annual and herb beds, roses and other exotics, or to improve drainage in a manageable area (such as the root zone around small trees and shrubs).

Most common problems related to soils:
Iron Chlorosis (Iron Deficiency) - The high pH of our soils changes iron from a form that plants can use (ferrous) to one that is unavailable to plants (ferric). Iron deficiency causes leaves to lose their green color, starting at the outer edges of the leaf and progressing inward. Leaf veins usually remain green. The newest leaves, located at stem tips, are the most affected.
Management: Apply chelated iron according to the directions on the product label.

Nitrogen Deficiency - During times of active plant growth, native soils may not be able to supply sufficient nitrogen. (Fortunately, many of our native plants have the ability to "fix" their own nitrogen!) Plant growth is slow and plants are spindly. Older, lower leaves are affected first and turn yellow. Leaves may drop off or remain on the plant.
Management: Use a fertilizer containing nitrogen, according to the directions on the label.
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Soil too Alkaline - Plants growing in soils too alkaline for their needs may develop yellow areas between the veins on the newest leaves.
Management: Avoid planting acid loving plants such as rhododendron, azaleas, hydrangeas, *etc*. Soil pH can be corrected by adding soil amendments, but this can be expensive and time-consuming as it must be done at consistent intervals throughout the entire life of the plant. Acid loving plants may be grown in containers where their needs can be easily met in a controlled environment.

Salt Damage - Limited rainfall contributes to an accumulation of salt in soils as 30" of rainfall per year is needed to leach salt through the soil and away from plant roots. Salt can also accumulate due to the application of fertilizers (especially manure) and shallow irrigation (watering). Leaves turn brown and look somewhat "burned" due to the deposit of salt in the leaf tips and margins. Leaves drop and plant growth slows down. A white crust may be visible on the soil surface or on the outside of clay pots in which plants have been planted.
Management: Deep irrigation is necessary to flush the salt beyond the root zone. Potted plants can be immersed in a bucket or tub of water to leach out salts.

Hardpan or Caliche - A soil layer that allows very little water to pass through. In desert soils it is usually caused by a caliche layer in which the soil particles have been cemented together by minerals. Water retained in the shallow soil layer above the hardpan quickly evaporates, causing the plant to wilt in hot dry weather. Adding more water to the plant may drown the roots, killing the plant.
Management: Avoid planting in a hardpan area. An option is to dig
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drainage chimneys (see *Cooperative Extension Planting Guidelines: Container Trees and Shrubs*, publication AZ1022).

Other problems related to soils - See the *Sunset Western Garden Problem Solver*, or the *Cochise County Master Gardeners Manual.*

NOTE: If Texas Root Rot is suspected, it can only be diagnosed by examination of the roots under a microscope. Very often, overwatering can mimic the symptoms of Texas Root Rot. Bring pencil-sized roots in to the Cooperative Extension office for diagnosis.

Ginger Maxey and Cheri Melton
Master Gardeners

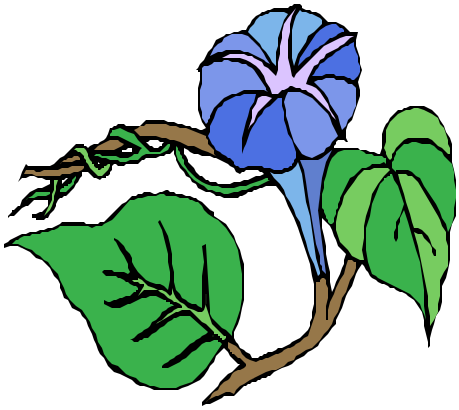
(Reprinted from the October 2001 Cochise County Master Gardener Newsletter)

Cuttings 'N' Clippings

❄ The next CCMGA meeting is 5:00 p.m. Thursday, October 6, 2005 at the University of Arizona South campus, Room B160 in the new building. Sandy Kunzer will speak on *Geology of the San Pedro Valley for Gardeners, Birders, and Anyone Who Drinks Water.*

❄ Sierra Vista's Farmers Market is open every Thursday from 3:00 until 6:00 p.m. through October. It is held in the parking lot adjacent to the former bowling alley on Wilcox Dr.

❄ Fresh Farm Produce booklets are available from the Cooperative Extension. They list the Harvest Calendar for Cochise County farms.



In a Desert Garden

Ipomoea-Morning Glory

Now that the monsoon season has come and gone, everything is thriving. With the rains also come the Morning Glories. I am not talking about the plants we know from the East, those beautiful vines growing on fences and arbors. No, I am talking about these dainty vines that appear with the rains and are native to this area. Unfortunately, Morning Glories are not welcomed in Arizona thanks to the ranchers, and of course I can see why. All parts of these plants are poisonous and as they ramble through the grasses, they pose a real threat to the cattle that consume them. Serious poisoning of cattle has occurred. On my little city lot I do not worry about cattle and enjoy these beautiful seasonal vines. My absolute favorite is Scarlet Creeper-*Ipomoea coccinea*, also a Hummingbird favorite. It is a small twining vine with tubular red to orange flowers with white-tipped stamens. As I never really know where it will show up, I have two metal towers I just poke into the soil and *voilá*, something for the plant to climb. I also let it ramble through shrubs. Eventually, the plant will form seeds for another season and die. The other native Morning Glory in my yard is the Woolly Morning Glory – *I. desertorum.* This plant has beautiful bluish purple flowers, a little smaller than those of the garden varieties. This one I just let twine into little mounds. I love the bluish flowers. The third wild Morning Glory on our property is the tiny Bird's Foot Morning Glory – *I. leptotoma*. It has very tiny lobed leaves and pink, bluish, or purple trumpet shaped flowers. The ones growing in our yard are pink. All three varieties only come out with the rains. No irrigation will bring them out before their time. Unfortunately it is not possible to buy seeds for these little beauties—just hope they will show up on their own. Maybe a bird will bring them in.

Angel Rutherford
Master Gardener

October Reminders

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

The Virtual Gardener—Water Harvesting Permaculture Style

The monsoon in the High Desert for me is Mother Nature's big annual bash. Like every great party—and this year's was a super one—there's always a mess to clean up when the party is over. I'm in the midst of cleaning up the mess right now, a super growth of "plants-out-of-place" as we gardeners euphemistically call the plants that every one else calls weeds.

During the subtropical conditions of the monsoon—the Tropic of Cancer after all is only a day's drive south of here as the proverbial crow flies—it's hard to remember we live in a desert. When the monsoon ends, the ugly reality of our situation reasserts itself. We have to remember to start watering those plants we've neglected for the past couple of months, and once again our thoughts turn to the problems of getting the most benefit out of the drops of water we expend.

As I was surfing the Net the other day I found an interesting discussion of a water harvesting/ conservation project in Jordan organized by Australian permaculturalists Geoff and Sindhu Lawton. Their results were truly amazing and their techniques have applicability for us in the High Desert.

Permaculture (*i.e.*, permanent culture) is a design philosophy that seeks to create self-sustaining manmade ecologies of plants, animals, and people. The philosophy was first conceived in 1959 by an Australian naturalist, Bill Mollison, and articulated over the next couple of decades by Mollison and another Australian, David Holmgren. Permaculture is now practiced world-wide. If you would like to learn more about the permaculture philosophy, do a Google search on "permaculture" or check out these Web sites:
http://www.azpermaculture.org

http://www.permacultureportal.com

The Jordanian permaculture pilot project involved the reclamation of about 10 acres of salt-poisoned farm land in an extremely arid climate utilizing the principles of water harvesting, heavy mulching, soil amending, and systematic plant selection. Natural rainfall in the project area is 4-6 inches a year, mainly occurring in two or three events in the winter. Summer temperatures top 120° F. (And we poor little High Desert rich kids complain about getting only 15 inches of rain a year and temperatures in the 90s!)

The water harvesting for the project was accomplished by digging eight swales (ditches) on contour across the project area. The swales were approximately 18 inches deep and 6-10 feet wide. Soil removed from the swales was piled on the down-slope side of the swale creating a berm that was about 18 inches high. Drip irrigation was installed in the bottom of the swales and the swales were filled with organic mulch.

Tough desert-adapted leguminous trees—trees that fix nitrogen from the air—such as mesquites and acacias were planted on the upslope side of the swales to provide shade, shelter from the wind, and nitrogen to the soil. Fruiting plants such as olive, fig, grape, and others; ornamental shrubs, vines, and flowers; and vegetables—tomato, cucumber, onion, eggplant, *etc*. were planted on and below the berms on the down-slope sides of the swales. Interestingly, and contrary to current recommended practice here, the fruiting trees were installed in holes amended with manures and compost.

The results of this experiment were truly amazing. The plants in the project area thrived, producing fruits that had never been grown in the area before. Water use was one-fifth the amount used on similar farms in the surrounding area. And salt levels dropped dramatically in the areas around the swales. The local farmers became alarmed a few months later when they discovered a strange, unrecognized fungus growing in the swales. The fungus turned out to be mushrooms, a plant these desert dwellers had never seen before.

If you would like to learn more about the Jordan permaculture project, read the article titled "The Dead Sea Permaculture Project" at http://www.permaculture.org.au/.

Until next time, happy surfing!

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The Agent's Observations

Q I have a lot of grasshoppers in my yard. They are eating everything! There are some really big ones. How can I control them?

A In Cochise County we have several species of grasshoppers, some are very colorful and grow quite large. The most striking is the two and one-half inch Horse Lubber (*Taeniopoda eques*). Grasshoppers emerge in the spring from eggs laid the year before. Grasshoppers hatch as miniature adults and molt 5 or 6 times during a period of 40 to 60 days. The young feed in the immediate vicinity and then move on to "greener pastures" as food sources become depleted. Adults begin laying eggs shortly after they mature. Eggs are laid in the ground in pods that contain 15 to 75 eggs. A female can lay a total of 200 to 400 eggs during several weeks. Hatching rate depends on soil temperature and moisture and may continue for 3 months. Some species have more than one generation per year. Grasshoppers feed on grasses and other plants. When populations increase they will feed on nearly any kind of vegetation including bark and leaves of deciduous trees. Adults continue to feed until cold weather kills them. Natural weather cycles cause fluctuations in populations.

Mild winters and warm, dry springs increase hopper populations. Cold, wet weather cause slow development and favor grasshopper diseases. Cool summers and early falls delay maturity and decrease the egg laying period.

Control: If desert surrounds your property it can become very difficult to control grasshoppers because of large populations that can become migratory. Disturbing egg pods in the soil by tilling or plowing will expose egg pods, decreasing their viability. Young small hoppers are easier to control than adults. "Picking and squashing" is a time consuming but effective control measure. Several chemical insecticides will control grasshoppers as well as the abrasive nature of diatomaceous earth. *Nosema locustae* is a naturally occurring disease organism of grasshoppers. Bran and sweeteners are added to Nosema to attract the hoppers. Grasshopper are cannibalistic and infection spreads as healthy hoppers eat sick ones. Also, the females pass this disease on to future generations through laid eggs. Nosema will take longer to destroy grasshopper populations than conventional pesticides. This is a living organism and must be stored in the refrigerator and has a limited shelf life. Contact your local nursery or garden catalog for current recommendations. **Always read the label of pesticides and use them accordingly.**

Source: *Insect Pests of Farm, Garden, and Orchard.* 1979. R.H. Davidson and W.F. Lyon. pp. 117-119

Q Surflan is called a preemergent herbicide. What does that mean, how and why are they used?

A Preemergent herbicides are a class of weed killers that are applied to the soil before weeds emerge from the ground. The activity of these compounds usually kill germinating seedlings before they emerge from the soil. The new roots and/or shoots absorb some of the material and the little plants die. The herbicides are applied to the soil and are usually incorporated into the soil by tillage or irrigation after application. This is necessary because environmental factors such as sunlight cause these products to degrade over time.

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With pesticides there are several names of each compound that must be understood to avoid confusion. For a single pesticide compound there are three classes of naming. The first is the long chemical name from which a good chemist can reconstruct the molecular structure. The second is the common name, which is registered and approved by the EPA, and is peculiar to that compound no matter the manufacturer. This common name is analogous to a scientific or Latin name of a plant. The third name is the trade name. This name is usually copyrighted by the seller, but the same chemical can have many trade names. Similar to common plant names. After patent rights expire on the compound anyone can manufacturer the chemical and give it any name they choose. By law all of this information must be found on the label. For example a common preemergent herbicide has a chemical name of: 3,5-dintro-N4, N4-dipropylsulfanilamide. The common name is oryzalin. Trade names, (used by manufacturers to distinguish their products), are Surflan, Monterey Weed Stopper, or Weed Blocker. The manufacturer may sell compounds to others who package in smaller home use size containers and give their packaged material a name. Oryzalin (Surflan) and several other preemergent herbicides in the dinitroaniline family, like trifluralin (Treflan) are yellow to orange in color. This is because they were synthesized by the dye industry and discovered to have herbicidal activity. Surflan for example is bright orange and Treflan is yellowish in color. When these products are being applied by farmers, city, school or pest control company employees, the uninformed are concerned. For example, on road median islands or in park landscapes people have become irritated thinking "Agent Orange" was being applied! This is not the case. The two are not related. The best time to apply Surflan herbicide in the landscape is in the spring and/or again in the fall. Surflan persist from four to six months depending on environmental conditions and the concentration applied. It works well over crushed granite or gravel that does not have plastic under it. Surflan can also be applied to lawns, flower beds (where flower seed is not planted) or transplanted into, as long as the plant roots are below the preemergent herbicide. Surflan must be watered in within 30 days or it is broken down by sunlight. Here in the high desert it is best to get it watered in within the first week. With proper and timely application a "weed barrier" is formed and many grasses and broadleaf weeds will be controlled. **As with all pesticides read the label and follow all instructions**.

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