High on the Desert Cochise County Master Gardener Newsletter

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

Meet the "Master" Master Gardener!

The Cooperative Extension is part of land grant universities throughout the United States and its agents serve as a conduit for dispersing knowledge acquired through scientific research to our community. We are fortunate here in Cochise County to have Rob Call, Extension Agent, Horticulture.

Rob earned his Bachelor of Science at Brigham Young University in Horticulture and his Master's Degree in Plant Science from Utah State University. After graduate school Rob joined the faculty with the Department of Horticulture at the University of Illinois. He was stationed at Dixon Springs Agriculture Center, a 5,000 acre research facility, where he worked with warm season vegetables and small fruits, and spent time working to bring research to gardeners. He returned to the west and managed a commercial apple and cherry orchard south of Salt Lake City.

When the opportunity to work with University of Arizona Extension came up, Rob, his wife, Su, and their five children moved to Willcox 13 years ago. Rob's expertise and inclination to educate make him a wonderful resource to home gardeners whether you want just a nice yard or want to grow your own fruit and vegetables. He teaches the Master Gardener course each spring and says he enjoys teaching people who are interested in the subject, because "it is a real pleasure to see the light come on when someone picks up on a new idea."

He frequently speaks at horticulture events throughout the country and last fall was selected to work with the farmers in the Republic of Georgia. Because he is an avid gardener at his home in Willcox, raising small fruits, vegetables, and an ornamental garden, he brings hands on experience to his job.

(Continued on page 2)

Inside this issue:

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Rob says that if he could convince gardeners in our area of just three things, they would:

1. Learn which plants are adapted to our climate and grow them.
2. Learn about our climate and don't try to garden in the hot, dry, windy months of May and June.
3. Understand we live in a desert where water is precious so use it but don't waste it.

Rob and his Master Gardener volunteers are available to us through the Extension office at the University of Arizona South and at his office in Willcox.

Master Gardener

March Reminders

- Prune roses
- Start seeds indoors
- Check cactus for fungus
- Plant cool-season veggies
- Reconsider your water usage (call Water Wise for a free audit)
- Remove and replace winter mulches

Robert E. Call

Robert E. Call
Extension Agent, Horticulture

Carolyn Gruenhagen
Editor

In a Desert Garden

Centranthus ruber –
(Valeriana rubra)
Jupiter's beard – Red Valerian

Virginia Meyers, a member of the Sierra Vista Area Garden Club, gave me a start of this wonderful plant. Red Valerian is native to the Mediterranean but has naturalized over most of Europe and North and South America. It is very drought tolerant and in my garden it does well in places where it gets no additional irrigation. Unfortunately it can be considered a weed in some areas and is not welcome. It does self-seed freely, and I let it grow wild at the outlines of my back yard. The plant is medium tall with very attractive grayish-blue leaves that are oval or lanceolate. The flowers are rounded in clusters of hot pink. White flowering plants are also available. This plant blooms from May until November in my garden. It forms a nice clump to 3 ft. high and wide. It loves poor and dry soils but needs good drainage. It also does well on slopes. To prevent prolific self-seeding, dead-head flowers which also encourages more flowering.

Angel Rutherford, Master Gardener

Cuttings 'N' Clippings

❄ The next CCMGA meeting is 5:00 p.m. Thursday, April 7, 2005 at the University of Arizona South campus, Room 503. There will not be a meeting in March due to the High Desert Gardening & Landscaping Conference.

❄ A *Water Wise* Workshop will be held from 9:00 to 11:00 a.m. at the University of Arizona South campus on March 26. The title is *Introduction to Drip Irrigation* with Penny Artio, UAS Grounds Supervisor and Cochise County Master Gardener. You will learn about emitters, filters, pressure regulators and much more. Penny says, "It's easy!" The following Saturday, April 2, also from 9:00 to 11:00 a.m. at the University of Arizona South campus, Penny will present the workshop *Build a Drip System.* Drip systems are not maintenance free and can waste a lot of water. Participants will be outside to build, maintain, and repair a drip system. Bring a hat, water, and wear work clothes. For more information contact Cado Daily at the Cooperative Extension, Ext. 2139.

❄ Watch for details on the upcoming Spring Xeriscape Tour sponsored by Water Wise and the Cochise County Master Gardeners Association scheduled for May 7.

The Virtual Gardener—Garden Chemistry I

To the uninformed the letters NPK might represent the initials for a defunct Soviet spy agency, but to the gardener they represent the chemical symbols for three of the most important chemical elements required for plant growth—N for nitrogen, P for phosphorus, and K for potassium—and the standard way of reporting the ratios of these three elements in the composition of fertilizers. The three numbers, listed by law, on every fertilizer container stand for the percentages by weight of these elements in the fertilizer.

For the next few months, I want to take a look at the importance of each of these elements to the gardener. We'll begin with nitrogen.

Nitrogen is an essential element in the composition of amino acids, the building blocks of all protein. Whether you are a plant or an animal you can't build proteins without amino acids, and you can't build amino acids without nitrogen. All proteins are built from twenty-some amino acids. Plants, collectively, can make them all.

Ironically, while nitrogen (N_2) is the most abundant gas in the earth's atmosphere (78% by volume and 75% by weight), neither we nor plants can make direct use of this source because the nitrogen atoms are bound together so tightly they cannot be easily torn apart and recombined with other atoms. Like Coleridge's Ancient Mariner surrounded by an ocean of water he could not drink, so our plants are surrounded by an ocean of nitrogen they cannot use, at least directly. Plants can only take in nitrogen that has been combined with other elements in compounds such as ammonium ($-NH_4$) and nitrate ($-NO_3$) salts. So if nitrogen gas is so indestructible, how do plants get the nitrogen they need in a form they can use?

The answer is from bacteria, blue-green algae, and perhaps some fungi. One set of bacteria (such as *Azotobacter*, *Clostridium*, and *Rhizobium*), in a process called *nitrogen fixation*, have learned tricky ways of disassociating the nitrogen atoms in atmospheric nitrogen gas and recombining them with other elements to produce the compounds that can be used directly by plants. Another set of bacteria have learned how to extract nitrogen from dead organic matter in the soil and turn it back into ammonium salts in a process called *ammonification.*

The soils of temperate and tropical regions are usually rich in organic matter that can supply much of the nitrogen required by the plants that grow there through the process of ammonification. Desert soils, however, are usually poor in organic matter and plants that are adapted to these regions must rely more heavily on the atmosphere for their supply of nitrogen. For this reason many plants from arid regions are legumes.

Legumes are plants that have established a symbiotic relationship with a genus of bacteria called *Rhizobium* that invade the roots of their host plants and cause knobby bumps, called nodules, to develop on the roots. The bacteria living inside these nodules work their magic to decompose nitrogen gas molecules and transform them into ammonia (NH_3) that can be used by the plant to manufacture amino acids. The bacteria, in turn, receive energy and nutrients from the plant. Mesquites are an example of a leguminous desert plant.

Proteins are needed for plants to grow. Some of these proteins make up the protoplasm and other components of plant cells. Others are enzymes that control all chemical reactions inside the plant. If plants cannot obtain sufficient nitrogen from the environment to support new growth, they will attempt to obtain nitrogen by the catabolism of older tissue. For that reason, a sign of nitrogen deficiency in plants is chlorosis (yellowing) of older leaves, which have been robbed of nitrogen, while younger leaves remain green.

Many plants we use in our landscapes or for food production are not leguminous and will suffer from nitrogen deficiency in our desert soils if additional nitrogen is not added to the soil. Fertilizers that supply nitrogen fall into two broad categories—chemical and organic. Plants do not care whether the nitrogen comes from one or the other as long as it comes in the form of a nitrate (NO_3^-)

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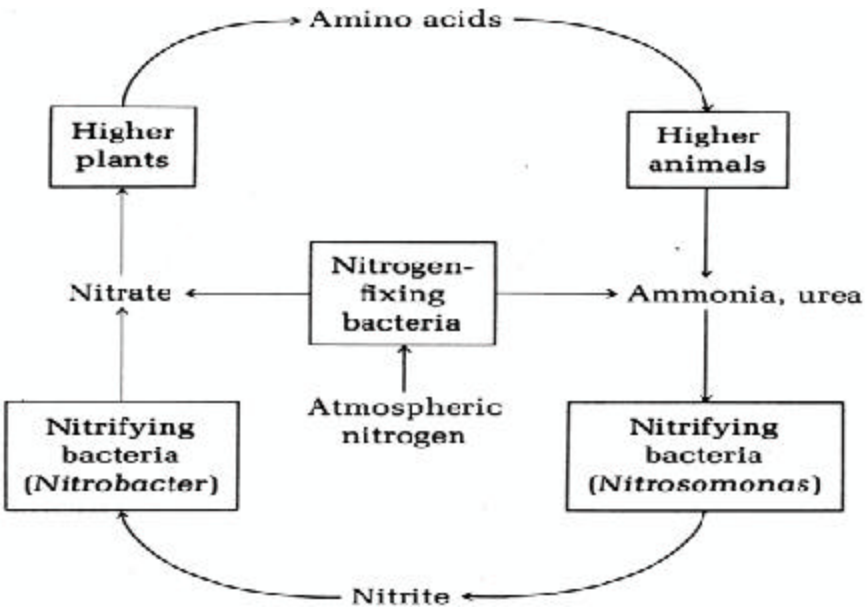
Garden Chemistry I—continued



or ammonium (NH_4^+). The difference is that chemical fertilizers tend to release the nitrogen rapidly (perhaps even more rapidly than the plants can take it up) while the organic fertilizers release the nitrogen more slowly because complex organic nitrogen compounds have to be broken down by bacteria before the nitrogen becomes available to the plants.

Chemical fertilizers containing nitrates are the fastest acting since nitrate is the form of nitrogen most preferred by plants. Ammonium must be converted to nitrate before the plants can use it. Also, ammonium ions are negatively charged and will be adsorbed by clay particles in the soil making them less available to plants than the positively charged nitrates.

Adding organic matter is a good way to improve desert soils. Not only is it a good source of nitrogen, but it loosens tight clay soils and improves the retention of moisture in sandy soils. Be careful, though, not to add too much high carbon matter all at once because the microbes in the soil that digest the carbon materials also need nitrogen and will rob the soil of it to satisfy their own needs. This results in a shortage of nitrogen for the plants growing in the amended soil, and they become chloritic.

Since plants require nitrogen for growth, the best time to add it is when the plants are actively growing during the spring and summer. Feeding plants with nitrogen late in the season can encourage tender new growth that will be damaged by frost. Add only the amount of fertilizer recommended on the container. Adding too much nitrogen can burn or even kill plants. For flowering and fruit producing plants, cut back on nitrogen to promote flowering and fruit production in lieu of vegetative growth.

I mentioned that the three numbers on a fertilizer container tell you the percentages by weight of nitrogen, phosphorus, and potassium in the fertilizer. To determine the amount of nitrogen in a quantity of fertilizer multiply the first of the three numbers by the weight of fertilizer and divide by 100. For example, 5 pounds of ammonium sulfate (21-0-0) contains (5 X 21)/100 = 1.05 pounds of nitrogen.

If you would like to learn more about how plants use nitrogen, point your browser at one of these sites:
http://biology-pages.info/
http://www.biologie.uni-hamburg.de/b-online/e00/default.htm

Next time we'll take a look at phosphorus. In the meantime, happy surfing.

Gary A. Gruenhagen, Master Gardener
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Desert Wildflowers

Wildflower expert Russ Buhrow, curator of plants at Tohono Chul Park, Tucson, thinks this year's bloom is going to be somewhere between really good and incredible. Web sites with information on finding wildflowers are:
www.desertmuseum.org/programs/flw_blooming.html

www.desertusa.com/wildflo/az.html

The Agent's Observations

Q What type of tree do I have that produces these large fruit, about the size of an orange with very winkled skin? Is the fruit edible? Where is this tree from? I have not seen it in Southern Arizona before.

Leaf, fruit and twig thorn of Osage Orange or Hedge Apple (*Maclura pomifera*)

A A sample of the tree leaves and a fruit were brought into the office. This is the Osage Orange or Hedge Apple (*Maclura pomifera*) that are native to the south-central United States, in Arkansas, Oklahoma, Texas and perhaps Louisiana. Trees can grow from 10 to 50 feet tall and to 1-2 feet in diameter with bark breaks into broad, round scaly ridges. Spiny twigs support 3-5 inch long pointed leaves with smooth margins that turn yellow in the fall. Most notably are the large spherical, 3-5 inches in diameter, yellow-green winkled fruits with milky sap. The milky sap can cause dermatitis. The fruits are inedible but upland game animals eat the seeds that are found in the fruit. Hedge Apples are used as hedge rows and windbreaks. Someone brought this tree to Arizona.

Source: *Trees of North America.* 1968. C. Frank Brockman. Western Publishing Company, Inc., Racine, WI. p. 148

Q My Meyer lemon tree has many leaves that are getting yellow and curling. This plant is in my greenhouse with other plants. What is causing this damage and how can I remedy it?

A Upon examination with a 60X dissecting microscope it was determined that the lemon tree was supporting a nice population of two-spotted spider mites (*Tetranychus urticae*). They are in the order Acari and the Tetranychidae family. These arachnids are very small, less than 1 millimeter or 1/50th of an inch in size. To determine if spider mites are on a plant use a hand lens or hold a piece of white paper under an infected leaf. Sharply tap the leaf, knocking the mites on to the paper. If you see small specks moving about you have spider mites. Adults have a head, abdomen, and eight legs because they are members of the spider family. Two-spotted mites can be clear when young, light-green, greenish-yellow or brownish in color as they mature. Their name is derived from a black area on each side of the abdomen. Two-spotted mites, like many other mite species, thrive in warm, dry, dusty environments and make fine silk webbing. Many spider mites species are general plant feeders, infecting a wide range of species while others are quite specific. Other mites feed on different organisms, like honeybees, while others are beneficial as predators of spider mites. It's a jungle out there! They have piercing-sucking mouth parts and cause mottling, bronzing, or yellowing of plants. When severe they can cause leaf curl, necrosis, and leaf drop. Feeding occurs primarily on the lower surface of leaves. Females can lay over 200 eggs. Mites may have 20 generations or more per year. They not only spread by crawling but are transported with the aid of insects, birds, air currents and the normal activities of humans.

Control: Natural control from predaceous insects and mites is important. With severe infestations the first step in control is to hose down the plant with a good stream of water from a hose. Do this every couple of days for a week, washing the mites off and changing their environment. If mites persist use a commercial insecticidal soap preparation. You can also make your own soap spray solution using liquid dish soap

(Continued on page 6)

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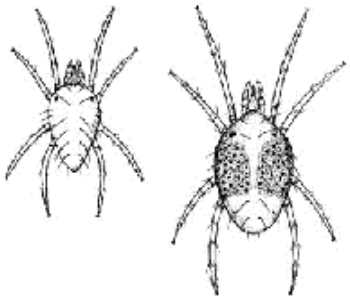

Male and Female Two-spotted spider mite (*Tetranychus*

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at a rate of two tablespoons/ gallon of water. Treat the infected plant a couple of times per week for three weeks. Spider mites can be difficult to control, so keep at it. Research has shown that using insecticides can stimulate reproduction in adults and imposes selection pressure that leads to chemical resistance. Also, because mites are spiders, insecticides are not very effective. Commercially acaricides are used to control spiders not insecticides. Acaricides are not available for homeowner use.

Source: *Insect Pests of Farm, Garden and Orchard*, 8th Edition. 1987. Ralph H. Davidson and William F. Lyon. John Wiley & Sons, New York. p. 217-18.

Robert E. Call
Extension Agent, Horticulture

Cochise County Master Gardener Training—Spring 2005

Rob Call, County Extension Agent, Horticulture will be presenting the class beginning Wednesday, March 16 and running for fourteen weeks through June 15 at the University of Arizona South. The classes are three hours long, 10:00 a.m. to 1:00 p.m. and will conclude with a final exam. The registration fee includes the Master Gardener Manual and Master Gardener shirt. Trainees are expected to give fifty hours of volunteer service required to become a Certified Cochise County Master Gardener. For information contact the Cooperative Extension Office at 458-8278, Ext. 2141.