



The Virtual Gardener—Mother Nature’s Gift

ADDITIONAL CONTENT IS AVAILABLE
ONLINE FOR THIS ARTICLE

In an average year—whatever that means—Mother Nature delivers more than 400 thousand gallons of water to my one acre property, assuming 15 inches (1.25 feet) of precipitation. If I make a few assumptions about the monthly distribution of this water and use the rates charged by my water company, I calculate the value of this water to be about \$800! Not bad...and it’s tax free.

Of course, that’s the good news. The bad news is that most of this water is not effectively used. In a perfect world, every drop of rainwater would run through the plumbing system of one of my plants before it ultimately escaped back into the air and was blown away to other places by the wind. But it’s not a perfect world, so let’s see what can be done to improve the situation at least a little bit. Our premise is that the best—and least expensive—place to store rainwater is in the soil. We will begin by looking at strategies to supply the rainwater to existing plants or to locations where we wish to install new plants.

If you are considering a large-scale project involving an entire property, particularly a building site, I recommend you consult a qualified civil engineer or

water harvesting specialist before proceeding. Water can be a dangerous enemy as well as a friend if it is not handled properly.

There are four problems to be solved: determining what happens to the rain that falls on your property, delivering the rainwater to a plant’s location, getting it into the ground, and keeping it there in enough quantity to supply the plant’s needs between rain events.

The first task is to find out what happens to rainwater that falls on your property. Direct observation right after a rain storm is one of the best ways to find out. I recommend taking digital photos of puddles, flow channels, wash patterns, and other water-made features for later study and analysis.

As water flows from higher to lower portions of the landscape, it may follow defined paths—rivulets, channels, ditches, or even gullies—or it may flow in thin sheets across the ground. Whether the water is flowing in channels or as sheets, the objective is to intercept these flows and redirect the water to our existing plants or proposed planting locations.

Once the water is directed to the location where we want to use it, we need to hold it

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there by creating a low spot where it can collect. Swales—shallow ditches with level bottoms dug on contour—and berms—small dikes also constructed on contour—are the best solutions for this problem. Plants take up water through their roots. To get water down to root level, we need to make sure it sinks into the soil. Soils with much clay and silt often prevent this from happening. One technique I have used successfully to get the water into the soil quickly is through “sand pipes.” I use a post hole digger to create 12-24 inch deep holes in the bottom of my swales and fill them with sand. These act as drains and allow the water to quickly penetrate into the ground.

The final water-harvesting problem is to increase the capacity of the soil to store water and keep it there until it is used by a plant. Increasing the amount of organic material by amending the soil and using mulches on the surface are two ways to keep the water in the soil.

Be sure to check out the online supplement to this article for additional content including:

- ◆ Calculating the Value of Rainwater
- ◆ Soils and Water
- ◆ My Swales and Berms
- ◆ Rainscape Photo Gallery
- ◆ Publications and Other Resources

To access this content go to

http://ag.arizona.edu/cochise/mg/VG_Supplements/1208VG_addendum.html

Until next time, happy surfing.

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In a Desert Garden

Mexican lobelia— *Lobelia laxiflora*

The Lobelia family is quite large with a variety of plants that somewhat differ from each other. Most of them are plants of moist areas and some are shade lovers. I grow 2 varieties of *Lobelia cardinalis* in my ponds. They are very showy plants and a hummingbird magnet. These varieties are plants from the eastern U.S., but I have one form growing in Arizona. In the canyons you will find *L. cardinalis* in the creek bed making an appearance during the monsoon. Some *Lobelias* are grown as annuals and used in containers; these are the low growing kinds and are found in blues, purples, and whites.



L. laxiflora is very different from all these and I have become quite fond of it. This plant is drought tolerant and is native to Arizona and Mexico. In my garden it has

formed a nice little clump about 1 square foot. It has narrow leaves and in spring is covered with tubular flowers in orange-red with yellow centers. It is considered a tender perennial and in my garden it freezes to the ground in winter. I mulch it well so it can come back in spring for another show. It is a well-behaved plant in my garden and so far I have not had any volunteers. Growing in a landscape with mild winters, like California, this plant can be invasive and as it can endure aridity and neglect can become a problem. I am growing it in full sun. My *Lobelia* struggled a little bit in this hot May and June and I had to give it some extra water. In a very hot situation with reflected light it will not do so well and it is better to plant it in

partial shade. It grows as a loose collection of separate stems and multiple rhizomes that makes it easy to divide—just dig it up and take some stems off to plant in a different location or to share with friends.

Angel Rutherford, Master Gardener

Cuttings 'N' Clippings

✧ The **August 2** CCMGA meeting will be a graduation of the new Master Gardener Class. For information, Master Gardeners are asked to call Joyce at 458-8278, Ext. 2141.

✧ On **Saturday, August 4**, 9:00—10:30 a.m. *Gardening with Wildlife* is the next free Water Wise presentation held in the Public Meeting Room on the UA Campus. Come learn how to make your yard wildlife-friendly while keeping others out (like snakes, javalinas, mice, and rats!) The presenter will be Tom Wood, Southeastern Arizona Birding Observatory and Water Conservation Educator, Water Wise/Energy Smart.



✧ Mark your calendar for **Sunday, September 9**, 1:00—4:00 p.m. when the 15th Annual Water Wise/Master Gardener Fall Xeriscape Tour will be held. Maps will be available mid-August. Contact Joyce at (520) 458-8278, Ext 2141 or

jwilliam@ag.arizona.edu for information/maps.

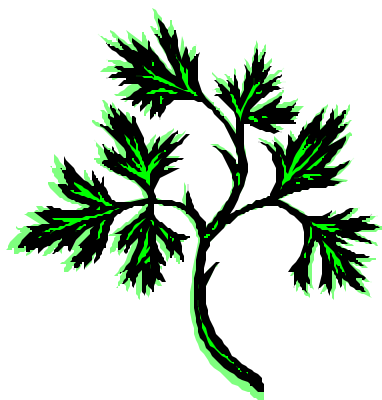
Herbs Are For Everyone

Herbs are often thought of as a small family of plants used to flavor foods. There is wide variety and diversity in the herb family such as parsley, sage, rosemary, and thyme, with perhaps basil and oregano thrown into the mix. Whether one is a vegetable gardener or a landscape gardener, herbs can fit right into your garden. Herbs offer culinary treats and landscaping aesthetics. Many people also value them for medicinal and therapeutic reasons. They are usually easy to grow and are also typically very tolerant of less-than-ideal soils and infrequent watering. In fact, many believe that stressful growing conditions yield tastier herbs because the stresses endured by the plants enhance production of the chemical compounds that give herbs their distinctive flavors. As a bonus, herbs also tend to be free of insect pest problems.

Many varieties of thyme and rosemary are hardy enough to survive year around in our high desert climate. Thyme can be grown as a ground cover. It's particularly attractive in a rock garden format. Thyme varieties are available in a number of "flavors" ranging from "standard" to lemon, lime, and orange. Rosemary, which is a member of the mint family (*Lamiaceae*), is available in a wide variety of forms and sizes and can be used as a ground cover, a shrub, a hedge, or even a small tree (some varieties can achieve a height of seven feet). Both rosemary and thyme are good choices for container growing as well.

Basil is a great summer time herb. It can't tolerate even a light frost, but it grows spectacularly in summer heat. A sizable variety of basils is available—among them are sweet (the standard tomato

sauce basil), lemon, lime, Thai, and cinnamon. Like most herbs, basil is claimed to taste best when it is not allowed to flower (rosemary is said to be an exception to this rule), so prune the flowers off as they appear if you're growing basil to eat. If not, or if your palate just isn't that refined (like mine), enjoy the pretty blue flowers and the bees that they attract. Oregano, another mint family member, also comes in oodles of different types. It grows well in summer and may even survive a mild winter.



Cooler season herbs include parsley, cilantro, and dill. I find it interesting that the use of cilantro is widespread in the cuisines of warm climate cultures such as Mexico and Thailand since these plants cannot stand hot summers.

Mints are a nice choice. They offer a wide variety of flavors, from the normal spearmint and peppermint, to more exotic choices like chocolate mint, apple mint, and pineapple mint. A fellow Master Gardener is growing eighteen varieties of mint in his garden this summer! Mint does require more moisture than most herbs, but it flourishes in hot weather. One of my fond memories is of a home I rented in Mesa during the mid seventies. The home had a basic

swamp cooler (making for miserable July and August months) that lacked a recirculating pump. Water ran in the top of the cooler and right out of the bottom. Below the cooler, in soil continuously dampened by the cooler run-off, grew a large patch of spearmint. When I mowed the yard, I'd always save that mint patch as the last section to be mowed, because then I could run into the house and enjoy the mint aroma that was blown through the house by the swamp cooler.

In addition to its wonderful edibility, garlic (really a vegetable) is a nice landscaping choice. Garlic plants vaguely resemble a tulip plant (minus the flower) or a Mother-In-Law's Tongue (or snake plant), with narrow, upright leaves that stay green for about eight months. Plant garlic anywhere in early October for a nice winter accent plant. It's easy to grow and pests of garlic are rare. Planted in October, garlic can be harvested in May or June when about one-third to one-half of the leaves turn brown and die.

For even more unusual choices, consider growing hops, lemon grass, fennel, cumin, bay, or crocus (*Crocus sativus* is the plant that saffron comes from). Hops are a perennial vine that can grow very large. They will scent your entire yard when they flower. Crocus flowers are beautiful and lemon grass makes a tall, spectacular, bunching display.

This article has barely touched on the huge group of plants we call herbs. Start exploring the world of herbs; it's a fascinating one.

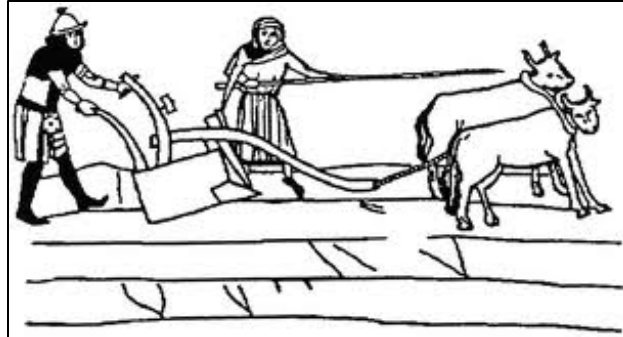
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Medieval Farming

Farming was prevalent in the Middle Ages and the Medieval economy was based on it. In fact, at least 85% of all products used, bought, and traded came from the soil. These products also helped to pay the Lord of the Manor who employed villagers to work this land. This was done under a feudal system put in place by William the Conqueror after the Norman Conquests. In England farming was based on the two-field system. This system used an inner field to grow crops and an outer field to pasture animals. Over time this system changed to a three-field system where a third field was left fallow for a season to rejuvenate the soil. These fields were often divided into strips of approximately an acre each. Each of these strips was cared for by a villager. This is where the Medieval term strip farming comes from. Such fields still exist in Nottinghamshire England.

Two innovations that occurred during this time were the mould-board plow and the horse collar. The mould-board plow was made of wood and metal and first introduced by Slavic tribes. The mould-board plow allowed for up to six oxen to pull a plow in the heavy clay soil found in Northern Europe. The horse collar allowed horses to pull a plow, something that had not been done before because horse tack was not adequate. The horse collar changed all that and horses were used more readily because they could be used for other purposes besides plowing.

Although their tools were primitive, the farmers were not. Farmers knew how to count and they knew exactly what plants yielded what amount of product per acre. They also knew what products sold well in what areas. For example, in beer drinking territories they focused on



Woodcut of an early English heavy plow with mould-board from the 14th Century.

barley, which could also be used in place of wheat for bread.

Monasteries were also important during medieval times. The monks became experts at horticulture, growing whatever products they needed to survive within their monastic walls. They also experimented with medicinal herbs. Monasteries were also responsible for preserving many of the manuscripts previously written by the Romans. The Romans were knowledgeable farmers and preserving these manuscripts allowed others to learn from them. Monasteries also cultivated and protected rare plants that later became popular during the Renaissance era.

The Middle Ages were not known for innovation and creative growth, but many things we have today arose out of these difficult times. The manorial system that regulated open-field farming created many of the agricultural terms we use today. The term horticulture came about due to the gardens that were located closer to the manor house and protected many herbs and other plants. Agronomy referred to crops being cultivated in an open-field system farther away from the house but still close enough to be tended to on a regular basis. Forestry referred to all the land that was not tended to at all.

Books became popular during this period and several manuscripts hav-

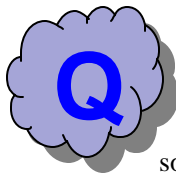
ing to do with botany were published during medieval times. The most popular was *Das puch der natur* "Book of Nature" by Konrad von Megenberg. What made this book so revolutionary when it was first published in 1475 was the fact that it was the first book that included botanical illustrations made of woodcuts. Previous to this illustrations rarely had anything to do with the plant at all but were merely mythological pictures depicting what the plants uses were. John Gerard was recognized as what we would call a Master Gardener today. He is famous for publishing a book called *The Herball* in 1597. This book listed over 1,800 known plants and included their uses, botanical names, common names, and descriptions of what type of environment they thrived in. He also added in plenty of legendary and mythological stories behind these plants and although many believe that the illustrations were plagiarized *The Herball* cemented his name in botanical history forever.

Next month: Renaissance Farming.

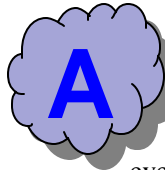
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Clouds 101



What kind of clouds produce precipitation during the monsoon or rainy season?



I am not a meteorologist or climatologist; and I do not play one on the evening newscast either!

I am told that most of our summer rains come from *Stratocumulus* and *Nimbostratus* clouds. I know clouds are made of tiny ice crystals or water droplets that have condensed from water that has evaporated into the air as the air cooled. Clouds change shapes and move as wind pushes them, or when they touch warmer air and start to evaporate. Weather is determined by clouds. Sunny days occur when clouds are absent or thin; days are dark when they are thick. Clouds act as insulation and provide shade, causing

temperatures to rise more slowly during the day and cool more slowly during the night.

Low clouds have a base of less than 6,000 feet above sea level. *Stratus* clouds, meaning “layer-like,” look like a smooth even sheet. *Stratocumulus* clouds are not as even and show light and dark areas on the bottom because they are piled up. Many times drizzle falls from these clouds.

Middle clouds usually lie 6,000 to 20,000 feet above sea level. They include *Altostratus* clouds that form a smooth white or gray sheet across the sky, sometimes thin enough for the sun to shine through. *Altostratus* clouds look like unconnected piles, or a layer of clouds piled together. *Nimbostratus* clouds are a smooth layer of gray that may be closer to the ground, but often you can't tell because it is raining or snow is falling from them.

High clouds are formed of ice crystals above 20,000 feet above sea

level. They often look like wisps of hair (*cirrus* means “curl”). *Cirrus* clouds are delicate and fine and may go even higher than 35,000 feet. *Cirrostratus* clouds combine thin sheets of clouds with wispy curls. These are the kind that make a “halo” around the moon at night. *Cirrocumulus* clouds look like little pieces of cotton high up in the sky, but they rarely form.

Clouds can tell us wind direction and what type of weather will be forthcoming. They entertain us with their beautiful shapes and make Arizona sunrises and sunsets some of the best in the world! You can learn a lot from the clouds.

Source: *Townhouse Magic Stars*, 1997. Back of a Cereal Box Publications.

(Note: Reprinted from the July 1998 *Cochise County Master Gardener Newsletter* written by Robert E. Call, Horticulture Agent.)

Monsoon Rains Have Hidden Benefits For Plants

The loud crackle and thunderous boom of lightning is now a familiar sound as our Monsoon is in full swing! But have you ever noticed that our summer storms bring more than just much needed rainfall? The desert, and plants in general, just seem greener after a thunderstorm. And the reason - with the rain comes a wealth of life-give plant nutrients.

Lightening is a potent fertilizing agent. Every time it strikes, nitrogen

in the atmosphere is combined with hydrogen or oxygen to form ammonium and nitrate, two forms of nitrogen. The nitrogen then goes into solution in atmospheric moisture and is washed to the ground in rainfall. Plants then absorb nitrogen from the ground and utilize it for growth. Since it is a key constituent in chlorophyll, the green pigment of plants, nitrogen causes a greening of the plant.

Physicists estimate that roughly 250,000 tons of nitrogen are produced by about 1,800 thunderstorms that occur on Earth every day. Our summer thunderstorms can release significant amounts of nitrogen for plant growth. That causes a significant part of the greening of plants we notice after a storm. But other constituents of rain also contribute to this greening.

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Sierra Vista Community Garden Update

Thanks to the generosity of Cochise County Master Gardeners Association (CCMGA), coupled with the ingenuity and hard work of two Eagle Scouts and their leader, five tiered planters and five raised beds have become permanent features in Sierra Vista's first Community Garden (SVCG).



On April 9, CCMGA presented a \$1,000 check to SVCG President, Rebecca Hillebrand, for the purchase of necessary materials enabling Jacob Reichert to plan and build five 3 by 20 foot raised beds while Douglas Scofield created the five tiered towers under the supervision, support and help of their leader, Eric Fast. In addition, a third Scout, Charles Woods, by means of his fundraiser, installed an underground aqueduct conduit. Through their combined volunteer efforts, these three industrious young men designed and painstakingly constructed ten distinctive planting beds and an extensive irrigation system, therefore completing important projects to earn their Eagle Scout Badges.

Now, four months following the Master Gardeners' enthusiastic monetary assistance, this 26,000 square foot parcel of vacant land made available through the good will of the proprietors of Professional Park 2700 L.L.C., attracts all age groups, bringing garden-minded people together in a positive social atmosphere to learn and reap the benefits of a low-cost avocation.

Garden plots are available upon request. The nominal fee subsidizes maintenance costs. Have you and your family taken a few moments to drive by the attractively fenced lot on Wilcox Drive next to the R and M Plaza to see what's cookin'?

Meetings are at 5:30 P.M. on the third Monday of each month; held in the RESTORE meeting room which can be accessed through the Wilcox Drive entrance. All interested gardeners, donors, and patrons who wish to partake in this wholesome endeavor are heartily welcomed and encouraged to participate. If you have questions or would like a garden plot, please call (520)236-8021, email svcommgardens@gmail.com or write to SVCG, 6101 Sooty Lane Hereford, AZ 85615.

Come have fun and enjoy "Breakfast in the Garden!" Saturday, August 25 from 7:00 a.m. until 10:00 a.m.

Dory Bushong, Master Gardener

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In theory, rainwater is pure. It is formed from evaporation of moisture largely from the ocean, but also from inland bodies of water, the soil, plants, and even animals. Condensation returns it to earth; but not before it picks up some hitchhikers. Sulfur is one of these. It is possible for rain to provide as much as 40 pounds of sulfur per acre per year – less in our desert environment – but still when the rains come so too does the sulfur. Sulfur is an important constituent in the formation of plant amino acids.

Dust is something we have no shortage of here in the southwest, but dust, although a nuisance indoors, can be beneficial. Dust is often carried thousands of miles on the upper air currents, and comes down to earth during rain storms. Dust carries with it a number of mineral nutrients necessary for

plant growth. It also contains beneficial micro-organisms which enhance plant growth. The solubilized nutrients can quickly influence the color of foliage. Micro-organisms aid in the breakdown of organic compounds into plant nutrients. They also create symbiotic relationships with plant roots which aid in the uptake of nutrients. All this translates into a rapid "green-up" of plants.

The level of soil benefiting elements and micro-organisms is related to the origin of such dust. Ashes from forest fires contain potash, an essential plant nutrient. Debris from volcanoes, which can travel world-wide, contains a wealth of essential minerals for plant growth.

Rainwater does have real benefits for plants. So, if after the next thunderstorm you notice everything looks greener, it's not your imagi-

nation! It's just Mother Nature working her special magic.

(Note: Reprinted from the September 1998 Cochise County Master Gardener Newsletter written by John Begeman, former Pima County Extension Agent.)

August Reminders

- ◆ Keep pulling the weeds
- ◆ Fertilize
- ◆ Prolong annuals
- ◆ Watch for nutrient deficiencies—sunburn, salt burn, over-watering, and insects
- ◆ Start thinking about cool-season flowers and veggies for your garden
- ◆ Plan for spring wildflowers