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High on the Desert

Cochise County Master Gardener

Newsletter

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

Garden Basics:
Planting Standards

The University of Arizona Cooperative Extension has released a new planting standard bulletin, AZ1022, dated 5/98. Studies have shown that tree and shrub roots lie within the top two to three feet of soil and extend one and a half to four times the width of the crown. Steps taken during planting to encourage the growth of these roots can reduce establishment time and help improve its long-term survival and stability.

The complete bulletin can be found on the web at
http://ag.arizona.edu/pubs/

Here are some notable changes.

New Standard: Mark a circular area three to five times the diameter of the root ball. Till or loosen this area to a depth no deeper than the root ball. Walls of the undisturbed soil should be rough and sloping. Dig the hole in the center of the tilled area slightly wider and no deeper than the rootball. A one gallon container will need an area tilled to the width of 2.5 feet, a five gallon container tilled width area will be 4½ feet and a fifteen gallon will be 7½ feet.

Old Method: Planting holes were dug out deeper than the root ball. Often the loosened soil at the bottom of the hole packed down after planting, the tree sank down thus promoting crown rot.

New Standard: Refill the planting hole with the soil removed from the hole. Do not use or add organic amendments such as manure, compost, or wood chips. These amendments do not improve, and may even worsen, the growth of the plant. Do not pack the soil. Water the plant in. This will remove any air holes without compacting the soil. More soil may need to be added after the first irrigation.

Old Method: Organic material was added to the backfill. Research now shows that the plant often will not grow beyond the amended soil area but instead will wrap its roots around and around itself. This creates an unstable tree that may require unnecessary staking and is prone to blow over in bad weather.

New Standard: Recent research shows that trees that can sway in the wind form stronger trunks. Stake trees only if they cannot stand without support or threatened by wind, frost heaving, or similar problems. Remove stakes as soon as possible, generally within a year. The bulletin gives excellent guidelines on how to properly stake a tree.

Old Method: Trees were always staked so they could not move and left staked for many years. Often the tree was girdled by the ties that secured the plant when it was young.

Poor drainage can cause problems because roots can drown if they stay too wet for too long. Test drainage by digging a hole about a foot deep and filling it completely with water twice during the day. Drainage is considered poor if water is still standing 24 hours after the second filling. If the results point to poor drainage, chimney holes may help or consider another area that passes the drainage test.

Now that you've saved money by not using amendments to the backfill, use it to buy mulch. Mulch is often overlooked in the planting process. Mulches are laid on top of the soil surrounding the plant to the depth of three to four inches (do not place against the trunk as this could promote rot) out to the dripline, the area where the rainwater drips off the leaves to the ground. Suitable mulches include ground bark, wood chips, compost, sand, and gravel rocks.

Cheri Melton
Master Gardener

Cochise County Cooperative Extension

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Dr. Jimmy L. Tipton
1949 - 1998

We dedicate this month's newsletter in memory of Dr, Jimmy L. Tipton, Arid Ornamentals Extension Specialist, Department of Plant Sciences. Dr. Tipton died July 8 at his home in Tucson, AZ. Jimmy's life's work is continued by his many former students, friends, and associates throughout university plant science research departments and the horticultural and landscape industries. He was a regular speaker at Master Gardener training classes and at the High Desert Gardening & Landscaping Conferences and the Master Gardeners of Cochise County will miss his wit and wisdom. Our condolences to his family.

Cuttings 'N' Clippings

➢ Mark your calendar for September 2, 5:00 pm, Mona Bishop Room at the Sierra Vista Library when our monthly Cochise County Master Gardeners Association meetings resume. Topics to be discussed are the High Desert Garden Fair (Sept. 12), the San Pedro House Project (due to be completed by Sept. 19), Buffalo Soldier Trail Project (Public Lands Day, Sept 26), and the High Desert Gardening & Landscaping Conference (Feb. 11-12)—whew! If you are looking to earn some Master Gardner volunteer hours this is the place to be! Remember—attendance at the general meetings counts towards earning MG hours also. See you there!

➢ The Ramsey Canyon Preserve is looking for volunteers! Project one is on August 1, transplanting native sedges and grasses around the pond. Project two is on August 8, collecting seeds from native grasses. Work begins at 8:00 am. The preserve is located 10 miles South of Sierra Vista off of Highway 92. These two projects have been approved for MG volunteer hours. For more information contact Angel Rutherford at 459-4115.

➢ Southeastern Arizona boasts the state's largest assortment of direct-sales farms. To obtain the 1998 brochure, contact the Cooperative Extension offices in Sierra Vista or Willcox or the Willcox Chamber of Commerce at 1500 N. Circle I Road, Willcox, AZ 85643, Tel. (520)384-2272.

➢ The Sierra Vista Garden Club's next meeting is August 20, at the Mona Bishop Room of the Sierra Vista Library. The speaker for the 2:00 pm meeting is Betty Woods Yates of Arizona Soaps.

The Agent's Observations

Q I have a pear tree that has some bumps on the leaves. Over time the bumps turn into brown spots. Is this zinc deficiency?

A No, this is not zinc deficiency. The damage you see is caused by the pear leaf blister mites (*Phytoptus pyri* Pagenstecher). This mite was introduced from Europe, probably before 1900. It is a pest of most pear growing areas of the world. Feeding by these mites causes damage on leaves and fruit. Blister mites overwinter as mature females at the base of buds or under outer bud scales.

Adults are light to amber yellow in color and cylindrical, tapered sharply at the posterior end and resemble a short worm. In spring, when buds begin to swell, overwintering females penetrate deeper into bud and lay eggs on live tissues. Development from egg to adult requires 20 to 30 days during spring. Feeding of females and their offspring causes blisters on developing leaves.

Blisters are green or red at first but turn light brown to black as affected tissue dies. As the blisters form, leaf cells near the center of the blisters die and pull apart as surrounding cells enlarge, creating a hole. Blisters vary in size, with the largest about 1/8 inch in diameter. Mites do not live in the blisters on the fruit, but the fruit will be scarred. Mites of the first spring generation enter blisters through these holes and feed on soft leaf tissue inside.

Several generations develop within the blisters during a growing season. Summer generations require only 10 to 12 days to develop. When blisters become crowded or leaves become heavily damaged, mites may migrate to growing terminals where their feeding produces new blisters. Fruit damage is caused by injury to buds before bloom. Severe damage to foliage can cause leaf drop and reduce shoot growth.

Look at young leaves before bloom early in the spring just as leaves are unrolling. Noticeable light green to light red rough areas where mites have been feeding will be seen. This damage becomes more noticeable as the growing season progresses.

Control: Blister mites are not normally controlled by natural enemies. Predatory mites will feed on blister mites when they are exposed. Blister mites often attack weak, neglected or abandoned trees. If a pesticide is used to control blister mites the best timing is after harvest when mites migrate from leaf blisters to terminal and fruit buds. They are exposed on those sites until buds swell in the spring. Pre-bloom treatments can prevent fruit damage that occurs just before and during bloom.

Source: *Orchard Pest Management.* 1993. Edited by Elizabeth H. Beers, et al. Good Fruit Grower Publications, Yakima, WA. Pages 151-153.

Robert E. Call
Extension Agent, Horticulture

Rabbit Remedy

Every year there is a new "home remedy" to spray or sprinkle on the garden to discourage the rabbits. Every year the rabbits still get their share.

I am not going to say that I won't keep trying all the special concoctions, but for now, I have a solution that is working. For a month now, a 20' X 60' section of my four acres, has been BUNNY FREE!!!

I have always found a chicken wire fence works, up to a point. My Rambo Rabbits usually find a weak spot and tunnel under it. You should see some of the holes they make. I even sat and watched one the other morning, stick its paws in the chicken wire, and start to climb up it. Lucky for me, the top edge was a little loose .. he lost his balance and fell back to the ground. I felt like going out and giving him a carrot for his efforts.

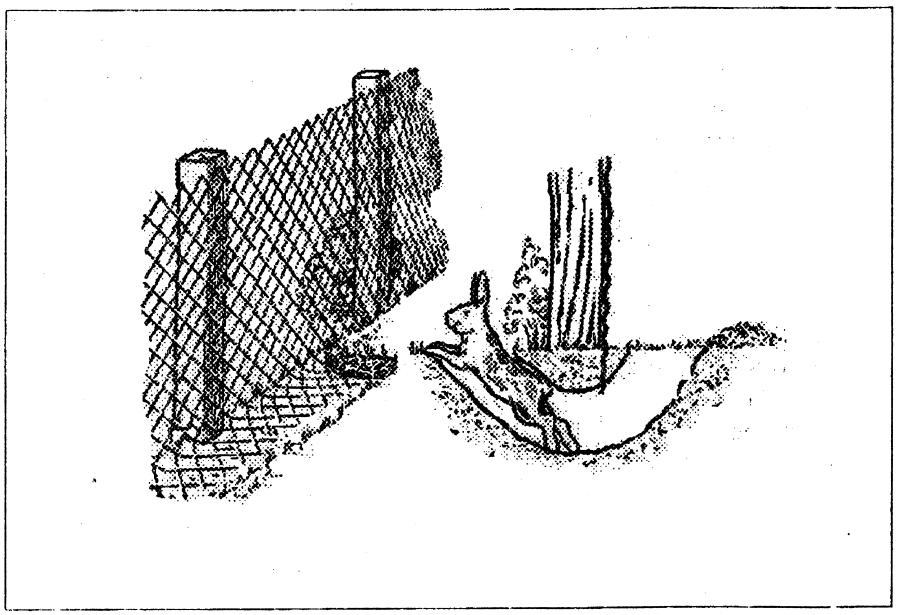
Now I think I have found a design for a chicken wire fence that works. If you watch rabbits, they always start digging right up next to a fence line. Attach a 6" wide shelf of chicken wire all along the bottom of your fence, and bury it about 2" deep. Be sure this is placed on the side away from your garden. The rabbits will be immediately stopped by this underground shelf, and they never think to try their digging further away from the fence.

If you want to make your fence completely of chicken wire, use 38" wide wire, placing 6" of it underground. (Again, be sure to face this lip away from the garden) Don't stretch it too tight at the top because leaving it wobbly at the top will make any climbing rabbits fall back down.

One other thing I have done, is to move my bird feeders away from the main garden. Rabbits love bird food. I have erected the flower stocks from two dead century plants (*Agave americana)* and hung the feeders on them. On the lowest branch, I have a large feeder about 3" from the ground. I fill it with chicken scratch, which is less expensive than wild bird feed. I have found both the rabbits and the quail love it.

This idea for the fence came from a 1947 issue of *Popular Science*.

Linda Jenkins-Wensel
Master Gardener Associate



August Reminders

- Keep pulling the weeds
- Fertilize
- Prolong annuals
- Plan your spring wildflower garden
- Watch for nutrient deficiencies, sunburn, saltburn, overwatering, and insects
- Plant cool-season flowers and veggies

High Desert Garden Fair

September 12
9:00 am - 3:00 pm
The U of A Campus
Sierra Vista

FREE to the public!

Seminars
Information Booths
Farmer's Market
Vendors
Crafts
and much more

FUN FOR ALL!!!

Robert E. Call

Robert E. Call,
Extension Agent, Horticulture

Carolyn Gruenhagen,
Newsletter Editor

Evening Primrose, an Overlooked Native

Here in the West, we have numerous members of a wonderful group of drought tolerant native flowers, many of which are hard to find, or altogether overlooked. These plants can take partial shade or brutal full sun, require only occasional watering, propagate easily, and bloom profusely in the evenings and early mornings. Several of the species are evergreen, and provide an attractive green ground cover whether they are in bloom or not. Additionally, they provide a source of nourishment to a different subset of nectar feeders than many of the other flowering plants. These are from the family Onagraceae, genus Oenothera, evening primrose. Other names for members of the group include Sundrops and Flor de San Juan.

General characteristics of Oenothera are that they can be annual, biennial, or perennial. Blossoms are white, pink, yellow, have four petals, four sepals, eight stamen and a four-celled seed pod forms against stem. The blossoms tend to be from two to four inches in diameter, and the plants can be from six inches to five feet tall. They range in altitude from sea level to 9,000 feet, but are most common from 3,000 to 7,000 feet. Cold hardiness varies, but is usually to about 10°F.

Evening primrose has been used historically for medicinal purposes, and recent clinical studies indicate that the oil of evening primrose is high in Gamma-linolenic Acid (GLA) and is useful in regulating fatty acids, reducing hotflashes and PMS, and improving exema and psoriasis (when used topically). Other studies concerning use in some types of heart disease look promising, but it's too early to tell

Did you know that 21 native Oenothera have been documented in Arizona alone? In a good year, you may find three Oenothera species plants available locally. Most likely the Baja (*O. stubbii*), Mexican (*O. berlandieri*), and Missouri (*O. missouriensis*). All are great in full sun, but a little extra late afternoon or morning shade allows longer enjoyment of the blossoms. All three are attractive low water use ground covers. The *O. stubbii* and *O. missouriensis* have large yellow flowers. I have killed both Missouri and Baja primrose plants by overwatering. I now put four to five different low water use plants, including a couple of Missouri tubers, in an area served by a half gallon drip.

The Mexican evening primrose (*O. berlandieri*) is perhaps the best known of the desert southwest Oenothera. This plant is a living contradiction. It is amazingly drought tolerant, surviving on just natural precipitation in some of the local microclimates. In others, minimal watering is enough, yet it produces abundant, very delicate pink blossoms. A little additional water results in a profusion of pink, which can last much of the spring, summer and into the fall. Propagation is easy. I keep a one gallon container and divide it twice a year. Plant two thirds, re-pot a third. Just add a little water and the plant does the rest. It makes a nice evergreen groundcover and bronzes slightly in the winter. If given more water than it needs to survive, it can become invasive.

My recent enjoyment has been from three native primroses that have voluntarily appeared in the yard. Two were recognizable because they had the classic evening primrose lanceolate leaves. One turned out to be Prairie evening primrose (*O. Albicaulis*) and the other, which I'm still researching, has beautiful large yellow blossoms on a six inch plant and seems to be perennial. The third has been an amazing experience. When it appeared in the yard, it didn't look like anything I'd ever seen before. It did not have classic primrose lanceolate leaves or gray-green color. For two months it grew taller and put out radial branches. I cut back one side of it as it was blocking the sun of several other plantings. Finally, over Fourth of July weekend, it bloomed just before sunset. What a knockout! At the end of each of 12 or 15 remaining radial branches, two to four lemon-yellow blossoms opened, and at the top of the five foot center spike, four to six bloomed. They were about three inches in diameter and smelled like plumeria, but not as strong. Several hummingbirdmoths gorged themselves on the nectar, their feeding tubes caked with pollen. There was a repeat performance each evening. The plant turned out to be Hooker's evening primrose (*O. hookeri*), a biennial. I hope to have seeds to share in early September.

Sources of native primroses are hit or miss. Mexican evening primrose, and occasionally Baja or Missouri, can be found at Ace Garden Place in one gallon pots. Missouri can be ordered, for as little as fifty cents a tuber, from catalogues like Fields and Gurneys and will survive here. (Don't order them in the late summer unless you can handle wintering them over in a cold frame or microclimate which will allow them a fighting chance to establish during our colder months. Mine arrived in November having broken dormancy during shipping. Between that shock and the puppy getting into the make-shift cold frame and trying them as chew toys about half survived.) Plants of the Southwest in Santa Fe, NM has seed available for 5 different evening primrose, not including the Mexican. White Flower Farms had plants of two species (*O.fruiticosa* glauca 'Solstice' and *O. Speciosa* 'Rosea') in their spring 1998 catalogue, Shepherds has seeds for one (*O. Pallida*).

Gretchen Kent
Master Gardener Associate

The Virtual Gardener-

Evapotranspiration 102

Last month we explored how plants absorb water from the soil and return it to the air in a process called evapotranspiration. This month we will see how agricultural scientists at the University of Arizona and elsewhere have developed ways of predicting exactly how much water is used by plants so that farmers and gardeners like us can know exactly how much water to apply to our crops and gardens to replace that which is lost.

These agricultural scientists grow turf grass on huge but very sensitive scales called lysimeters so that that they can tell exactly how much water is applied to the turf and how much is lost through evapotranspiration. By carefully measuring such external factors as temperature, solar radiation, humidity and wind speed, they build *models* that predict how much water the grass will use. In scientific parlance, a model is a replica of something a scientist wants to study. The exact type of model depends upon the purpose of the study. Models may be small physical representations of an object (iconographic models), descriptions of an object that reside inside a computer (computer models), or mathematical equations that describe the behavior of something (mathematical models). The model used by scientists at the University of Arizona to predict evapotranspiration is a mathematical model called the Penfield Equation which was developed by scientists for the California Irrigation Management Information System (CIMIS). The value calculated using this equation is called *potential evapotranspiration* (ETo).

Knowing ETo helps nurserymen, farmers, greenskeepers and other professional growers apply just the right amount of water required to grow healthy plants. The Arizona Meterological Network (AZMET) has been supplying these professionals with ETo data since 1986. Recently they began putting these data on the World Wide Web so that anyone with access to the Internet can take

ARIZONA METEOROLOGICAL NETWORK MONTHLY SUMMARY

Bonita
1998

DATE	AIR TEMP			REL HUM			SOIL TEMP		WIND SPEED		SOLAR RAD	RAIN	ETo	HEAT UNITS		
							2"	4"	MX	AV				55	50	45
	MX	MN	AV	MX	MN	AV										
7/1	103	59	83	39	6	18	93	88	27	5.1	747	0.00	0.36	21	26	31
7/2	97	69	83	53	16	34	94	89	29	8.7	658	0.00	0.34	25	30	35
7/3	95	67	78	82	21	54	92	89	27	6.3	523	0.04	0.24	24	29	34
7/4	94	65	78	87	26	57	89	88	26	4.7	615	0.01	0.26	23	28	33
7/5	83	67	73	99	46	77	84	86	16	4.0	417	0.16	0.14	20	25	30
7/6	84	67	74	95	45	74	83	84	22	6.3	472	0.00	0.19	21	25	30
7/7	87	67	73	99	37	74	83	83	26	6.3	398	0.01	0.16	22	27	32
7/8	87	64	72	98	38	77	82	83	26	3.1	377	0.34	0.12	21	25	30
7/9	90	63	77	100	31	66	84	82	16	2.9	703	0.02	0.27	21	26	31
7/10	98	66	82	91	16	51	89	83	28	4.5	712	0.00	0.31	24	29	34
7/11	100	65	83	91	16	46	91	86	18	4.5	676	0.00	0.31	24	29	34
7/12	101	71	86	72	13	32	94	87	19	4.9	709	0.00	0.35	26	31	36
7/13	100	65	83	74	16	40	93	89	18	5.8	708	0.00	0.34	24	29	34
7/14	101	66	85	73	15	35	94	89	19	5.1	686	0.00	0.33	24	29	34
AVG	94	66	79	82	24	52	89	86	23	5.2	600					
TOTAL												0.58	3.72	318	388	458

RESULTANT WIND VECTOR = 0.7 MPH AT 318 DEGREES

Table 1. Monthly Summary Data July 1, 1998 to July 14, 1998

ABBREVIATIONS AND UNITS

MX : MAXIMUM FOR DAY AIR TEMP
MN: MINIMUM FOR DAY
AV: AVERAGE FOR DAY

AIR TEMP: AIR TEMPERATURE IN DEGREES F
REL HUM: RELATIVE HUMIDITY IN %
SOLAR RAD: SOLAR RADIATION IN LANGLEYS
SOIL TEMP: SOIL TMEPERATURE AT 2 AND 4 INCHES, IN DEGREES F

RAIN: RAINFALL IN INCHES

ETo: REFERENCE CROP EVAPOTRANSPIRATION IN INCHES

##: MISSING DATA, ETo & HEAT UNIT TOTALS ARE PRORATED

55: TEMPERATURE LIMITS - 86/55 DEGREES F

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advantage of this information. The URL for AZMET is: *ag.arizona.edu/AZMET.*

To provide this service, AZMET maintains 23 field sites at various locations throughout Arizona where meteorological data are collected. Each of these sites is equipped with a sophisticated suite of instruments to measure data on air and soil temperatures, relative humidity, solar radiation, precipitation, wind speed, and wind direction which are reported hourly. ETo is calculated from these data and also reported hourly. As might be expected, these reporting stations are concentrated central Arizona in areas with heavy agricultural development. The closest station to us in Cochise county is at a site called Bonita 18 miles north of Willcox in Graham county at an altitude of 4416 feet. The soil type at the Bonita station is a loamy sand (77% sand, 16% silt, and 7% clay).

You can view hourly, daily, weekly, and monthly data for the Bonita station from 1987 to the present in two formats. Raw data files are in comma delimited format suitable for direct importation to a spreadsheet or database. Reports contain the same data formatted in a more human- friendly way. Monthly reports sum- marize the data by day and are probably the most useful for gardeners. Table 1 on Page 5 shows data for July through the 14th.

The table shows us that the total ETo for July as of the 14th at Bonita was 3.72 inches. This means that—all other things being equal—3.72 inches of water would have to be applied to an area to replace the water that was lost to evapotranspiration. To trans- late that into something you can more easily relate to your water bill, 3.72 inches of water covering an area of one square foot equates to about 2.3 gallons. An area of turf measuring 25 X 50 feet would require 2875 gallons of water to replace what was lost to evapotranspiration! Now you know why we advocate xeriscaping with minimum turf.

Next month I will discuss how you can use ETo data to estimate how much water is required to maintain your yarden. In the meantime... HAPPY SURFING.

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