



High on the Desert Cochise County Master Gardener Newsletter

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The Virtual Gardener—A Monsoon Myth

A few weeks ago at a meeting we were discussing the unusually large amount of rain we had late in June and someone factiously mentioned that the more rain we get in June (normally one of our driest months) the poorer our monsoon. I had heard this generalization before and wondered if there was any truth to it, so I decided to investigate further.



The first problem was to get some data to work on. This required a visit to the Web site for Arizona Climate Summaries (<http://www.wrcc.dri.edu/summary/climsnaz.html>) that contains a large amount of historical weather data for 219 sites around the state. From there I gathered data on rainfalls in Sierra Vista for June, July, August, and September for the years from 1982 through 2005. Next I added the rainfall amounts for July-September for each year and used that number as the rainfall total for the monsoon season (see table on next page). If you would like to do this yourself for another location besides Sierra Vista, there are data for many other locations at this Web site.

As you can see from the table, the highest rainfall for June was just over five inches in 2000 and in many years there was no rainfall at all for that month. The average for June was a little under a half inch. The rainfalls for July, August, and September ranged from a high of almost 15 inches in 1983 to a low of about three and a third inches in 1997 with an average of nearly eight and a half inches.

(Continued on page 2)

Inside this issue:

Companion Planting	3
Cuttings 'N' Clippings	3
Mesquite Trees	4
Mosquito Facts	5
Taste the Desert	6
August Reminders	6

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Year	JUNE Precipitation	Monsoon Precipitation
1982	0.00	7.24
1983	0.00	14.98
1984	1.01	11.61
1984	1.01	11.61
1985	0.88	7.35
1986	0.58	7.48
1987	0.53	11.24
1988	0.18	14.76
1988	0.18	14.76
1989	0.00	4.88
1990	0.34	8.60
1991	0.00	7.11
1992	0.00	9.87
1993	0.52	5.14
1994	0.05	5.06
1995	0.00	7.53
1996	0.56	7.66
1997	0.00	3.39
1998	0.00	9.59
1999	0.43	10.85
2000	5.04	8.27
2001	0.83	7.76
2002	0.05	7.13
2003	0.02	8.63
2004	0.44	5.10
2005	0.00	10.62
Average	0.47	8.45

Summer Precipitation for Sierra Vista



Robert E. Call
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Carolyn Gruenhagen
Editor

The next step was to analyze the data to see if there was in fact any relationship between June rainfalls and total monsoon precipitation. This required the use of a complicated statistical computation to compute a “correlation coefficient.” Fortunately Excel (and I’m sure other spreadsheets as well) allow you to painlessly do the computation to compute the coefficient so that was not a problem. The coefficient calculated by my spreadsheet was about .007.

But what is a correlation coefficient anyway?

To spare you the ugly technical details, the correlation coefficient is a number that can take on any value between -1 and +1 and tells you how well two sets of values track each other. In this case, I was tracking the values for June precipitation and total monsoon precipitation. If as the values in one series increase, the values in the other series increase in the exact same proportion, the correlation coefficient is +1 and the two series are said to be perfectly positively correlated. If as the values in one series increase, the values in the other series decrease in the exact same proportion, the two series are said to be negatively correlated and the correlation coefficient is -1. If there is no relationship between the values in one series and the values in the other, the correlation coefficient is zero and the series are said to be uncorrelated. The closer the correlation coefficient is to zero, the less correlation there is between the series. In our case, the coefficient is .007 which is pretty darn close to zero. From that we can conclude there is very little, if any, relationship between the amount of rain that falls in June

and the total amount of rainfall received during the monsoon season.

Correlation and causation are often confused. Had we found a perfect negative correlation between June precipitation and monsoon precipitation, that alone would not be a valid reason for saying that high June rainfalls *cause* low monsoon rainfalls. Besides simple coincidence, many correlations are the result of the action of third unknown factor that influence both of the correlated phenomena. A humorous anecdote is often told in statistics classes to illustrate the fallacy of confusing correlation with causation. It goes something like this:

For three nights in a row I drank too much and woke up the next morning with a hangover. The first night I drank bourbon and water, the second night I drank scotch and water, and the third night I drank rum and water. The common element in my drinks for each night was water and the severity of my hangover and the amount of water I consumed each night were perfectly correlated. Therefore I conclude that water gives me a hangover.

So now we know that the amount of rain that falls in June has no bearing on the amount of rain that falls during the monsoon, so we can go back to the perennial question asked by Arizona desert rats every year, “I wonder how much rain we will get this summer.”

Until next time, happy surfing.

Gary A. Gruenhagen, Master Gardener
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Companion Planting

Companion planting has been defined by *Rodales's Illustrated Encyclopedia of Herbs* as a 'plant chosen for interplanting or intercropping with a given plant because of its ability to enhance or complement another's growth.' Whether or not this 'ability' is valid has been questioned and debated.

Companion planting has been used by many gardeners and herbalists for generations. They swear by it. Scientists have been slower in gathering their information. Their verdict is still out. Many controlled experiments are showing that common herbs and vegetables influence the health and growth of nearby plants.

Research into the allelopathic and autoallelopathic abilities of certain plants to produce toxins is tilting to a definite existence of phytotoxins responsible for 'enhancing or complementing' neighboring plants. Juglondon, a plant produced compound, is found in black walnut leaves and roots and prevents many plants such as vegetables, blackberries, lilac, peonies, and apple trees from growing in the vicinity. The needles of pine trees seem to have similar characteristics;

preventing even other pine trees from competing.

There seems to be FIVE things that are stated regarding companion plantings:

- 1) they may improve the health and flavor of plants;
- 2) they may interfere with the growth of nearby plants;
- 3) they may repel pests;
- 4) they may act as 'traps' for pests; and
- 5) they may attract beneficial predators, parasites, and pollinators.

There are many examples of companion plants. Briefly, I will mention six such combinations that are said to be effective. Aphids can be deterred by planting any of the aromatic herbs. Corn earworms are repelled by cosmos, geraniums, and marigolds. Likewise, the leafhopper is repelled by geraniums. The tomato hornworm is offended by dill, borage, and opal basil. Basil intercropped with tomatoes and peppers are enhanced in flavor and growth.

So have fun keeping a garden journal, reporting and experimenting. Enjoy your companion plantings and see if these combinations work in your garden even if the science has not yet proven their effectiveness.

David Davis
Master Gardener Associate

Cuttings 'N' Clippings

* The next CCMGA meeting is 5:00 p.m. Thursday, August 3, 2006 at the University of Arizona South campus, Room 503. Our own Extension Agent, Rob Call, will tell us all about his July adventures in Kyrgyzstan.

* The free *Water Wise* program on Saturday, August 5 9:00 a.m.—2:00 p.m. will be *Water Wise Plants and Planting* with Jan Groth, Arizona Certified Landscape Professional. This is a big topic so it is being divided into two parts: 9-11:00 a.m. will be on planting and plant care, and 12—2:00 p.m. will be on plants. Bring your lunch to eat on the Arizona Folklore Preserve deck. For more information contact Cado Daily at the Cooperative Extension, 2139.

* Maps for the September 2, 2006 *Water Wise/Master Gardener Fall Xeriscape Tour* will be available at the Cooperative Extension office mid-August. For information contact the office at 458-8278, Ext. 2141.

Without Friends
life would be
like a garden
without flowers

Mesquite Trees Under Stress

A healthy 'Velvet Mesquite' tree (*Prosopis velutina*) is a hardy, well-adapted tree to the Southwest with few problems. However, if the bark of the mesquite has been damaged or is under stress, it can be susceptible to certain destructive insects called "borers" or "Cerambycid beetles."

Stress to a mesquite tree can be due to the tree being planted too deep or overtime, having sunk in its planting hole. The trunk base becomes partially covered with soil causing the trunk tissue to slowly die, along with the tree. It will continue to die over a slow period of time unable to resist attacks by insects and fungus. Other causes of stress can be attributed to soil compaction, trenching or cutting roots, wounds from poorly made pruning cuts, broken limbs, fire and/or lack of water, especially when young.

These insects will not attack the healthy, undamaged wood of the mesquite tree because the water pressure exerted by the uptake of water in the xylem layer may be so strong that it literally blows the small, newly hatched larvae of the borers right out of the tree. If the tree is unhealthy or under stress, water uptake is reduced to the point that the small larvae can penetrate and move into the cambium layer where they begin feeding and growing.

One type of borer known to be a problem to mesquite trees is the roundheaded borer, also called the "long-horned" beetle which get its name from its long 11-



Prosopis velutina

segmented antennae which are often as long as or longer than its body. Some antennae reach lengths of four or five inches long. The enlarged thorax behind the head may be mottled or banded with white or gray. The thorax and wing covers on some species have small stout spines.

The roundheaded borers look for stressed trees, stumps, and cut firewood to attack. They will not infest structural wood as with some species of termites. Adult round-headed borers of the mesquite tree do very little damage to the tree and spend most of their time feeding on the pollen of the flowers. The adult beetles lay their eggs on the weakened, damaged parts of the tree and the emerging larvae bore into the tree and feed under the bark. As they mature they bore deeper into the inner layers of wood. They may take one to several years to mature before they pupate inside the tree just under the bark, depending upon the specific species. The insects continue to feed, drilling long holes into the wood thus causing further weakening of the tree.

A specific borer referred as a "twig girdler" will kill small branches and twigs. The females lay eggs in the damaged girdled bark of the mesquite and the larvae develop within the wood. Small holes typically seen on the trees are the exit holes where the mature adult has chewed its way out of the tree. Other non-injurious insects may occupy the hole.

There are also other species of the Cerambycid beetles or "borers" which include the locust borer. The segment behind their head is not enlarged as with the roundheaded borer. The locust borer has colorations of black with yellow stripes and looks similar to a wasp. The larvae are uniform in width, legless, cream or white, and bore into the solid wood of the stressed or damaged mesquite tree.

Flatheaded borer is another species of Cerambycid beetles that most commonly invade damaged areas along the trunks and branches of the mesquite tree. Their main characteristics are their flat, wide heads attached to a dark-colored body about ½ inch long. The adult insects lay eggs in cracks and crevices in the bark of the damaged areas. After hatching, the young larvae tunnel directly into the bark. These maturing larvae feed within the vascular cambium area where water and food are transported through the tree. The borers riddle the conductive tissue with small ¼ inch or wider tunnels called "galleries" that criss-cross through the wood. Look inside

(Continued on page 5)

(Continued from page 4)

the small galleries and you will see small bits of sawdust. Within these tunnels inside the bark, these insects are well protected. With just a moderate amount of damage to the cambium, branch dieback will occur.

You will notice the first signs of damage from the flatheaded borers on the mesquite trees as small, amber colored globules of resin protruding from the trunk and branches. The resin oozes out of the wounds made by the insects boring into the tree's cambium. If you remove the resin, it will reveal the entrances into the galleries made under the bark. Loose or peeling bark in the area can also indicate the presence of borers.

The banded ash borer is commonly called a long-horned beetle because of its long antennae and is also of the family known as roundheaded borers as mentioned in the description of our first boring beetle. The adults are dark brown to almost black and from ½ to 1 inch long. There is a line of fine, white or yellowish hairs on the thorax and four bands of the same material and color across the wing covers. The first two bands meet and almost form circles. This species occurs in eastern Canada and most of the United States.

The life cycle of the banded ash borer is similar to most borer insects. The adults emerge in early spring and fly to the host material where they deposit eggs in crevices in the damaged bark of the mesquite tree. The larvae feed under the bark for a period of time before boring into the sapwood where they feed for the remainder of the summer. Pupation occurs in the fall but the adult does not emerge until the following spring. Typically one generation is produced per year but if the infested material is sawed, stored and dried out, the life cycle may require several years to complete.

Mesquite trees are adaptive and tough in the arid, harsh climate and terrain of the Southwest but they are vulnerable to other adapted dwellers of the desert as well. Nature has a way of ensuring that only the strongest will survive in the chain of life.

Linda Flores, March 2006

(Editors note: Linda Flores was a member of the last Master Gardener Class. She passed away May 24, 2006 just weeks before the class ended.)



Mosquito Facts

- ◆ There are 150 different species of mosquitoes occurring in the United States and over 40 species in Arizona.
- ◆ A single female can lay hundreds of eggs over her lifetime. *Aedes aegypti* eggs can survive for more than five years under certain conditions.
- ◆ All mosquitoes need water to complete their life cycle.
- ◆ Not all species bite humans; some prefer birds, others prefer horses, and some will even bite frogs, turtles and reptiles.
- ◆ Only females take a blood meal; both males and females feed on plant nectar.
- ◆ Some mosquito species fly considerable distances, 20 miles or more. Some species tend to remain close to their larval habitats.
- ◆ Adult females can survive several weeks.
- ◆ Mosquitoes are responsible for more human mortality around the world than any other living creature.

(For more information see University of Arizona Cooperative Extension bulletin *Mosquitoes* available from the University of Arizona Cooperative Extension offices in Willcox and Sierra Vista.)

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Taste the Desert Desert Heritage Health Foods

Saturday, August 19, 2:00 to 5:00 p.m. at the Sierra Vista Public Library, activist Carlos Nagel, whose company PROMEZ first marketed mesquite meal, will present *Mesquite, a Valuable Desert Food Source & Economic Opportunity*. Millions of acres of mesquite are being destroyed for rangeland, charcoal and firewood. Harvesting mesquite bean pods for meal is an alternative that provides a superior health food at the same time that it promotes conservation of desert lands. Mesquite recipe booklets for sale. Free mesquite harvesting and milling information handouts.

Menu: Mesquite Zucchini Bread with Mesquite Beverage, "Atole de Pechita."

Saturday, August 19, 10:00 a.m. to noon – *Harvesting, Preparing & Cooking with Prickly Pear Fruits & Pads "Nopales"* at Bisbee Farmers Market. Free samples of foods prepared. A similar presentation will also be given on Thursday, September 14, from 2:00 to 6:00 p.m. at the Sierra Vista Farmers Market.

Events sponsored by Baja Arizona Sustainable Agriculture. For more information e-mail vallimac@cox.net or call (520) 378-2973. Funding for these events comes from a mini-grant for Desert Foods for Diabetes & Health from the Cochise County Health Department's STEPS Program.

August Reminders

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

