



# Pinal County Cooperative Extension Garden & Landscape Newsletter July 2008



## UNDERSTANDING PLANT DISEASES

Sick and dying landscape plants are an all too frequent event in Pinal County and each year many expensive and valuable plants begin to show symptoms of injury and disease. In order to prevent plant problems, it is important to understand what causes disease. Let's take a look at some of the basics.

When we put a tree, shrub or vegetable seed into the ground, we want that plant; we expect that plant, to do well. Unfortunately, even under the best of care, a plant sometimes sickens, and even dies. It is often frustrating to put so much money, time and effort into creating attractive landscapes and gardens only to have them fail. While decline and death of plants may simply be a result of an unfortunate series of events beyond the control of any person, too often many plants die each year because of improper or insufficient care.

Plants fail because of a disruption in one or more of their critical life systems. Such disruption can be caused by a great many different possibilities, either by living disease agents, by the environment in which the plant lives or a combination of both. If the damage suffered by the plant exceeds its ability to compete, symptoms will arise. If the damage is great enough, the plant may die.

Up front, it is important to understand that plant disease is the rule rather than the exception. Every plant has disease problems of one sort or another. Fortunately, plants either tolerate these disruptions, or they are not very serious in most years. In the event that the damage reaches the critical level, however, serious injury or death can occur.

So, how do we as plant managers prevent damage to plants? The easiest and safest way to avoid plant disease is to not let it happen in the first place. Prevention involves using such techniques as disease-resistant plants, timely removal of diseased plants from the vicinity of healthy plants to prevent infection, or proper water and fertilization to maintain an active, growing plant capable of fending off disease agents and environmental stresses, like heat and wind.

Each plant has a different set of needs that must be met in order to keep its defenses up. This would include the availability of water, air and nutrient sources in the proper amounts needed to carry out life processes. Plants also have many outside enemies waiting to attack the defenses. By taking proper preventative steps before damage occurs, plant health can often be maintained.

—Plant Diseases, Continued on Page 5

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## RESETTING UPROOTED TREES

Are your trees ready for the monsoon thunderstorms?

With the relative humidity readings steadily inching up, we know that the monsoon season will soon begin. A series of three days in a row with readings dew point readings reading and average of 55°F or higher usually indicates that the monsoon season has arrived and that monsoon thunderstorms are a possibility. When these late afternoon storms come with a vengeance, it is virtually guaranteed that there will be trees somewhere knocked over or uprooted by the whipping winds.

Hard, blowing winds account for most of the damage to landscape trees and shrubs during the summer months. Uprooted trees with broken branches, many of them lying at cockeyed angles, toppled over and strung around like so many pins at a bowling alley are all signs that a summer storm has blown through.

To long term readers, this topic may strike a familiar chord. It should. We have talked about it every year now for several years running. At the risk of sounding like a scratched phonograph record, or a modern ipod that loops back in on itself playing the same song again and again, I feel that we need to address it again. Wind damaged trees continue to be all too common in our landscapes.

Once the storm has blown over and we have come out with hands on our hips to survey the damage, one of the first questions we have to ask is, "Can this tree be saved?" If all we have are broken branches, pruning the damaged branch back to its point of attachment may be the only chore and we can safely say to ourselves, "Whew, we got by easy on that one!" If, however, the tree has been uprooted, the decisions become more difficult and the prognosis for full recovery a bit more clouded.

Trees blow over because they do not have a root system large and well established enough to hold them in place during the blasting winds of severe storms. Young trees, and trees that

have a constricted root system, are particularly susceptible to this problem.

In general, trees with slight to moderate damage to the root system, can often be salvaged. Trees with severe damage to the roots may simply need to come out. It is difficult to place a hard and fast rule on what constitutes light, moderate and severe damage, but you can pretty much tell by how many roots are sticking up in the air. The more that are dangling in the air, the more severe the damage.

No matter what degree of damage, however, many trees that blow over during a storm can indeed be reset into place without harm if corrective action is taken within a few hours. Knowing how to do it correctly is important, but what is really important is just doing something, right or wrong.

When trees blow over, several kinds of damage can occur. Roots are ripped and torn; and limbs, branches and even trunks split or break off, sometimes stripping long lengths of bark as they fall. While the damage can be severe, in many cases it can be fixed. There are those situations, however, where the damage is so severe that the best course of action is to simply remove the tree. You, or your landscaper, will have to be the judge.

A tree with roots exposed to the air demands quick action. Ripped from the soil, exposed roots begin to dry out. When they lose their moisture consistency, the tissues die. If the tree can be reset and the roots covered quickly, many roots can be saved. Resetting downed trees is a fairly simple process. It takes the proper tools and supplies, and a little know how.

When you come up to a downed tree, it will generally be laying on its side with the crown of the tree pointing away from the direction of the wind. If there is damage to the root system, it will usually be most severe on the upwind side. Because broken and stretched roots can't provide enough support for the tree, it is important to provide that support on the weaker side by placing one or more stakes on the upwind side, or the side that is opposite to the head of the downed tree.

—Resetting Uprooted Trees, Continued on Page 6

## WATERING BASINS MAKE IRRIGATION SIMPLE

While plastic drip irrigation systems can be powerful tools in helping garden or landscape plants get the right amount of water at the right time, sometimes a low-tech approach, like a simple watering basin, may be a better choice.

Even in the wettest of years, water in the desert is a precious resource. In times of drought, water conservation becomes even more critical. Urban gardeners have a number of resources that can be used to ensure that every drop counts.

Drip irrigation systems have become popular in helping manage water in gardens and landscapes. Correctly designed and managed, they can contribute to water conservation and the healthy growth and development of landscape and garden plants. Unfortunately, drip systems also have their drawbacks.

They are expensive to install and maintain. They require constant attention to make sure that emitters do not plug, plant root systems do not outgrow the wetted pattern in the soil and that salts do not become a problem for susceptible plants. In addition, mistakes in planning, such as placing a plant with a high water requirement on the same drip irrigation line as a plant happy with less water, can create management nightmares and unhealthy soil conditions for other plants on the line. These mistakes are not easily solved.

Watering basins are a simple way to provide the right amount of water to a plant, no matter what the season. It is a tried and tested way of making sure that plants are watered correctly each and every time. In some cases, even if a drip system is available, a watering basin may be the best choice.

Irrigation basins are easy to make and use. In their simplest form, they can be just a mound of earth on the surface of the soil, just outside the leaf area of the plant above. The dike around the plant serves as a small dam that keeps the water in the area where the roots of the plant are most concentrated. This helps ensure that most of the water is used by the plant.

Proper basin irrigation management requires the understanding and correct application of two different concepts. First, proper timing or scheduling of irrigations is critical. A good way to get the timing right is to mark expected irrigation dates on a calendar. If the plant begins to look like it needs water before the calendared date, check the soil moisture level six inches below the surface of the soil. If it is beginning to dry out, go ahead and irrigate. Adjust the schedule accordingly.

It is easy in a basin irrigation system to tell when sufficient water has been applied. Calculating the depth and width of the basin will give a fairly accurate indication of how much water is applied during each irrigation. For example, if a plant needs two inches of water a week and the basin covers the roots and is two inches deep, then the needs are met by filling the basin once a week.

Another simple trick to estimate how much water is being applied to landscape plants is the municipal water meter. Water meters calculate usage of water in gallons or cubic feet. There are about 7.5 gallons in a cubic foot. To use the meter to measure how much water a plant is receiving, turn on a hose or sprinkler system and measure the amount of water going through the meter for one minute or sixty seconds.

If the meter registers one cubic foot of water delivered in one minute, it means that it will take about ten minutes for this part of the irrigation system to deliver 75 gallons of water to a given area. Water pressures can vary during the day, of course, so recalculation may be needed from time to time to ensure accuracy.

Mature citrus trees require about six inches of water every two to three weeks in July, but only one inch in January. In between, the trees require varying amounts of water depending upon weather and soil conditions. When the basin is two inches deep, a slow application of water to fill the basin to the brim three times in July and only half full in January will provide just the right amount of water to fill the tree's needs.

—Basins, Continued on Page 5

## GROWING CACTI IN DESERT LANDSCAPES

With the increasing interest in saving and conserving our precious water resources, many people opt to plant cacti as part of a low water use landscape.

While water savings is a major reason to grow cacti, it is only one of many benefits. Cacti add interesting form and color to the landscape. They give an authentic look of the desert to outdoor living spaces. They also attract birds who find their spiny protection an attractive place to build nests. If you enjoy bird watching, a cactus garden may give you hours of enjoyment.

We just mentioned the opportunity to bring different forms and colors to the landscape. Some cacti grow low to the ground while some stretch high into the air. Some appear soft and fuzzy while others have large spines that appear stark and forbidding. Some have colorful flowers of white, lavender and orange while others produce flowers so small that one has to look close to see them. The variety within the cactus family is truly impressive, and it is this variety that allows one to create a wide variety of effects within the landscape, and all for only a few gallons of water each year.

Many cacti are native to Arizona and do usually quite well with the rainfall that falls in a normal year. These native species include the familiar saguaro, barrel, hedgehog, Mammillaria, prickly pear and cholla cacti and are well adapted for landscape use in our area. Their presence in a landscape can give that authentic touch of native dignity that seems to legitimize and complement Arizona desert landscapes.

In addition to the native species, there are many non-native species that also do well in the desert environment. Compass barrel cactus, Ferocactus cylindraceus, and the old man cactus, Cephalocereus senilis are examples of species from other areas. Use of cacti from other areas in a landscape can bring variety and interest.

Because of the way that they are built, and the way that they carry out their life processes, cacti are well adapted to desert living, and make good low water use plants. The thick, wax-coated stems of cacti, for example, are quite resistant to moisture evaporation. This ability to protect themselves from

significant water loss through their tissues gives them considerable drought tolerance, when established, even in the driest of years.

Those are some of the benefits, but I know that you are saying to yourself, "Yes, but what about the spines?" Okay, let's talk about the spines. There are solutions, you know.

Cacti are leafless, but almost all of them have modified stems called spines. These spines can be straight and needle sharp, such as in the hedgehogs, or curved and broadly pointed like the barrel. These modified stems give a measure of protection from the feeding of animals that might be looking for a source of water. They can also cause a painful experience to anyone who gets too close.

The species of prickly pear and cholla have the same straight defensive spines that other members of the family have, but these particular cacti can be especially painful because they have a second type of spine. These tiny spines, called glochids, are hair-like whiskers with barbed structures on their surfaces. Almost invisible to the eye, they can be quite painful and troublesome. Many who have experienced these tiny spines have come to appreciate the value of sticky tape and tweezers as they have struggled to remove them from their skin.

It is the presence of spines, especially these glochids, that lead many to shy away from planting cacti in the landscape. A misstep off the path in a cactus garden can lead to a painful encounter with cacti. Dragging hoses to water other landscape plants almost always results in spines becoming attached to the hose. Invariably, these spines will be transferred from the hose to the hands, arms and legs of whoever might later be coiling the hose for storage.

The solution to solving the dangers of spines in the landscape is to keep the plants away from the normal traffic areas of the yard. While protecting people and pets, this unfortunately relegates the plants to out-of-the-way areas where the form and beauty of the plants is often hidden or minimized by distance. Depending upon the landscape design, this may or may not diminish the visual benefits of growing the plant.

## —PLANT DISEASES, Continued from Page 1

Living disease agents include bacteria, fungi, and viruses. These different organisms can penetrate the defenses of the plant and cause specific effects within the plant that may be life-threatening. Root rot, for example, is a fungal disease that can kill susceptible trees and shrubs within days of infection.

Bacterial diseases are caused by single-celled micro-organisms that are unable to manufacture their own food. Those bacteria that cause plant diseases must obtain their nutrients from the host plants.

Certain multicellular branching, threadlike organisms called fungi also cause disease by obtaining their food from living plants. Many fungi produce great numbers of tiny spores which can be carried by wind or water from leaf to leaf and from plant to plant. Each spore, under the right conditions, will germinate and grow into a new fungus, which can spread the disease.

Ultramicroscopic viruses are capable of invading plant tissue and reproducing in it. Viruses may cause abnormal growth and color changes in leaves or flowers.

Other agents that can damage plants include the parasitic plants, or plants which steal their water and nutrients from a host plant by invading their roots into the nutrient-rich tubes within the roots and stems of the plant. Over time, parasitic plants, like dodder and mistletoe, can seriously damage the plants upon which they are living.

Because Arizona has such a dry climate, many bacterial, viral and fungal disease agents that are so common in other parts of the country, simply do not survive here. That is not to say that we do not have our share, but the total pressure of living disease agents to garden and landscape plants is definitely much less.

Much more common to our area, are the problems caused by heat, low humidity and rainfall and the unrelenting sun. Such non-living agents can, and do, often cause serious injury in our area.

Each of these disease agents can often be prevented or controlled if the proper steps are taken at the proper time. That is why it is important to learn about these potential troublemakers and what can be done to lessen their impact.

## —BASINS, Continued from Page 3

A good rule of thumb to remember is based upon research that has shown that two inches of water on top of the soil will fill the soil profile of an average loam soil to about one foot. Sandy soils tend to require more water than heavier clay soils.

Basin systems provide other benefits. They serve as excellent catchment basins to collect excess rainwater. An arrangement of dikes and channels can help move the water into these basins. With a drip irrigation system, these free water events are often wasted as excess water drains off of the property and down into the gutters of the street.

Basin systems can fit unobtrusively into a landscape. Unless filled with water, the basins are generally unnoticeable.

The system is easy to expand as the needs of plants change. As the plants grow, for example, the outside diameters of the basins can be enlarged either by digging or simply using the force of water from a hose to move soil out from the tree. More elaborate basins can be constructed with concrete, cement blocks, or other permanent materials, but they should be constructed so that they can be enlarged as the plant grows.

With basin systems, one fundamental rule must never be broken. The lowest part of any basin should never be at the base of the plant. It is critical that water not be allowed to pool up against the trunk of the tree as this can lead to infection from soil borne root rotting fungi. A good practice is to build a second ring out about six inches away from the trunk to keep the water in the root zone and away from the trunk.

Good irrigation management is in the best interest of every person who lives in the desert. Drip irrigation systems have their place, but sometimes a more simple approach works just as well.

Trade names used in this publication are for identification only and do not imply endorsement of products named or criticism of similar products not mentioned.

## —RESETTING UPROOTED TREES, Continued From Page 2

Stakes should be of solid construction and at least six feet in length. Seven foot stakes would be better, especially for larger trees. Metal fence posts can be used, but most nurseries will have supplies of the long wooden landscape stakes.

To set the stakes in the ground, you will need a sturdy folding ladder and a heavy hammer. I like to use a ten pound sledge for this purpose. The extra weight makes it easier to drive the stake. A fence post driver works well for both metal and wooden stakes as long as the diameter of the stake does not exceed the inside diameter of the driver.

Depending upon the weight of the tree, one or two stakes should be placed approximately eighteen to twenty-four inches away from the trunk of the tree and driven to a depth of at least twelve inches into the ground. Twenty-four inches would be better, especially if the tree is large and heavy. Have someone hold the folding ladder while another person climbs high enough to provide good access to the top of the stake. Safety is important here. We do not want anybody hurt.

Once the stakes are in place, but before lifting the tree, cut sturdy rope or wire of sufficient length to go from the stake, around the trunk of the tree, and back again to the stake. Be sure to leave enough rope to tie a knot behind the stake or enough wire to twist the ends together. String the wire or rope through a piece of old garden hose and place it into position so that once the tree is upright all you have to do is gather the ends and tie off. Be sure that the protective hose is next to the trunk of the tree so that the rope or wire will not cut into the bark.

Once the stays are in place and ready to tie off, lift and push the tree back into position and secure the stays to their separate posts. When this is accomplished, the tree should be solidly in place. If the tree continues to wobble, place more stakes and add more stays until the tree is properly supported.

With the tree upright and supported, it is now time to bury any exposed roots. With a spade or digging fork, dig a trench long enough and deep enough to cover roots that have been pulled from the soil. Be sure to check the watering system to

ensure that there are sufficient emitters to wet the soil around the tree in all directions. This will encourage new root growth and development.

Heavy leaf canopies, branches with many leaves, can act like sails on a ship. These trees, which unfortunately are generally the best looking, are usually among the first to blow over. The increased resistance to the wind is simply too much for the roots to handle.

With the tree reset in the ground, it is a good idea to thin out a few of the branches to lighten the total weight of the tree and to present less resistance to the wind. Pruning of branches is best done in the winter when the trees are dormant, but selective thinning, like we are discussing, can be done safely during the summer if only a few small branches are selected for removal. If we are thinking ahead, sometimes we can avoid damage to trees altogether by practicing some selective thinning prior to the storms.

Try to make as few cuts as possible by first removing branches that are damaged or broken. Then, if necessary, remove branches that clog up the middle of the tree, or that are growing in a downward direction. Practice good pruning techniques and never leave a stub that you can hang a hat on. Stubbed branches turn into open doors for disease and insect infestations. Do not apply any pruning sealers to the fresh cuts. Leave them exposed to the air for quick drying.

Trees that have been reset after blowing over need time to recover. You will know that the tree is recovering when you see signs of new growth. The growth of new leaves and stems are an indication that the roots are growing once again. It is a sign of healing.

Trees are worth their weight in gold in the desert. They pick up carbon dioxide, a greenhouse gas, from the atmosphere. They cut down on the heat island effect by shading bare, heat-retaining surfaces. They also increase the value of property at the time of resale. For these and other reasons, every tree is important. Saving wind-damaged trees, in the final analysis, saves you money.

Another solution to the spine problem is to plant cacti in raised beds. The framework that creates the raised bed will automatically set the limits between space set aside for people and space that is set aside for cacti. The raised bed sends a strong message to all: Venture beyond at your own risk!

Besides physically limiting the possibility of people and pets moving into the garden space, the raised bed structure creates a barrier that will prevent a hose from being dragged into the cacti and serves as a boundary limit that will protect wheel barrows, electrical cords and other garden tools from coming in contact with the spines. It provides an extra layer of safety.

The raised bed garden also makes an ideal showcase for viewing the cacti. By locating the cacti closer to eye level, it places them in a position where their good points can be more easily seen.

To create a raised bed for cacti, consider using railroad ties placed side by side and end down to create a strong barrier. The ties should be buried about eighteen inches deep into the soil to prevent the weight of the soil inside the bed from pushing out the framework. The height of the bed can vary but probably should not be taller than twenty-four inches or less than twelve inches. The framework for the bed can be built square for a formal look, or with softened corners for a more natural feel.

Other materials can be used for a raised bed. Decorative or standard concrete blocks, lumber or even old, worn out tires can be painted and stacked in various arrangements to provide an interesting, but effective arrangement.

Whether grown in raised beds or planted normally in desert soil, cacti do best in soil that drains well. They do not like to have wet feet. For this reason, it is recommended that cacti be planted in soils that contain large amounts of sand. Sand is a type of soil that allows the free movement of water through the soil profile. It tends to drain quickly and give access to air to the soil around the roots. Cacti thrive under these conditions.

Another way to avoid root disease is to keep the water away from the trunk. This can be done at planting by creating small mounds and valleys in the landscape. By planting cacti at the peak of the mound so that water will drain away from, and not accumulate at the base of the plant, many rot problems can be avoided. Rotting tissue often leads to the death of the plant.

Weeds can cause a huge problem for those working in cactus gardens. Weeds growing in close proximity to spines will be difficult to remove by hand. Locate the garden well away from Bermuda grass lawns to prevent the invasion of this tough weed, and make sure the soil inside the garden is free of nutsedge tubers and other perennial weeds.

Most weeds in a cactus garden can be prevented by placing a one to two inch layer of rock mulch around the plant. Larger rock, such as 1.5 inch leach rock, makes the best mulch, but other sizes and colors will also work. The use of plastic on the surface of the soil under the rock mulch is not recommended.

With a little time, energy and knowhow, a cactus garden can provide beauty to the landscape and still keep the spines at a safe distance.

If you have questions, you can reach one of the Master Gardeners at the Cooperative Extension office, 820 E. Cottonwood Lane, Building C, in Casa Grande. The telephone is (520) 836-5221. The author's email address is [gibsonrd@ag.arizona.edu](mailto:gibsonrd@ag.arizona.edu).

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*Richard D. Gibson*

Richard D. Gibson  
Extension Agent, Agriculture

RDG/te  
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