THE UNIVERSITY OF ARIZONA
Cooperative Extension

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U of A Cooperative Extension, Pinal County 820 E. Cottonwood Lane, Bldg. C., Casa Grande, AZ 85122
(520) 836-5221 **http://extension.arizona.edu/pinal**

## Venomous Spiders in Arizona

There are two spiders locally, the black widow spider and the Arizona brown spider, that can cause serious medical problems. It is a good idea to know about them, how to avoid them, and what to do if we are so unfortunate to run afoul of them.

There are many spiders native to our desert home and all of them can bite. Fortunately, most of our local spiders are not a threat to humans and that is a good thing. We need the spiders desperately because they are very helpful. They feed mainly on insects. Without the spiders, we could easily be inundated with the things. Spiders as a whole help keep nature in balance, particularly where those six-legged critters are concerned.

How do spiders feed? They do have a mouth just like we do. Around the mouth are chelicerae, structures that help the spider feed. They use them to capture and hold down the prey until they can apply their particular style of venom and begin the feeding process. These structures are jaw-like in construction and have sharp edges that help them get the job done. The venom is a toxic liquid that is produced and stored in venom glands attached to these mouthparts. When a spider bites, it injects the venom into the prey.

Spiders are usually not aggressive, meaning they do not go out of their way to chase a human down and attack. Usually, a spider bite incident is usually associated with the spider being threatened, handled, or touched. It is during one of these kinds of events that a bite usually occurs. Let's talk more about the two most venomous spiders in the desert areas of Arizona.


Black widow spider

The adult black widow spider is probably the best known of the two. They are pretty common. The female is colored glossy-black with a bright orange to red hourglass-shaped marking on the underside of the abdomen. The body of the female is about one-half inch long and, with legs extended, may be up to two inches long. The males also have the red hourglass on the underside of their abdomen, but are cream and tan in color and much smaller in size. Newly hatched black widows are white with black spots on their abdomen with a cream-colored hourglass. Later, as they mature, they become cream and brown-striped. All stages of both sexes are venomous. Even the egg sacs contain venom so don't touch them directly. When you find one, it should be carefully removed and crushed to kill any young that might still be within before discarding.

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Webs made by black widow spiders are irregularly shaped with strands running in many directions. The somewhat stiff webs are said to appear "messy", meaning that they have no particular pattern. The spiders hide during the day, and hang upside down in their webs at night. When mature, the female mates and lays several hundred eggs. She then wraps the eggs in a silken cocoon called the "egg sac". Female black widows guard the sac until the eggs hatch. During this time she is most likely to bite when threatened. Egg sacs are most frequently encountered from May to October.

To avoid an unfortunate incident, be cautious when picking up or moving objects, particularly in outbuildings such as sheds or garages, or in shady, undisturbed areas such as under parked cars or in flower pots. Although they are not commonly found indoors, it is always a good idea to shake out and check clothing before dressing.

Black widow venom is a nerve toxin, which means that as it acts on the nervous system, it causes progressive muscle pain and can sometimes cause difficulty in breathing. The initial bite has been described as anywhere between a pin prick and a sharp stabbing pain, but some people do not even realize that they have been bitten. Although bites are generally not fatal, they should be considered dangerous. Contact the Poison Control Center, 1-800-222-1222, immediately for information about treatment and care if someone is bitten.


AZ brown spider

Arizona brown spiders are often mistaken for the brown recluse spider, which is not a normal resident of Arizona. The only brown recluse spiders found here are the ones who have been brought into the state in luggage or other belongings of people who recently come from regions where it does occur. This hitch hiking, fortunately, does not happen frequently. However, because these spiders are so closely related and because the venom of each causes similar symptoms, they are often treated, and feared, as one in the same.

The two species of brown spiders in Arizona closely have a dark brown marking on the front portion of their body which resembles a violin. They appear two-toned, with a tan front and gray rear body region. These spiders have three pairs of eyes in a crescent shape across the top, rather than the four pairs of most other spiders. Arizona brown spiders are usually small. Including legs, their total size is only about the area of a nickel. The body region of adults is one-third inch long.

Arizona brown spiders normally nest in protected areas, such as under wood or dead cacti in the desert, their native habitat. They can be found in urban areas, but it usually is because they have been brought in from the desert on firewood or pieces of cactus skeleton acquired for landscape purposes. They build a loose web of white silk where they stay during the daylight hours. As with the black widow, Arizona brown spiders are active at night.

Once again, these spiders are normally quite timid and only bite when trapped. Persons bitten apparently at first feel no discomfort, but as time progresses a blister forms, which may become an open ulcer. Other symptoms include fever and nausea. Persons bitten should make every attempt to capture the spider for identification and seek medical advice as soon as possible. This is especially true if one begins to show allergic reactions. The Poison Control number provided above is a good first call.

The best tool I have found for controlling spiders is a long-handled brush. The long handle allows for safety and extends the reach. The brush sweeps away the webs and generally knocks down the spider. Spiders on hard surfaces can then be dispatched with a shoe or a fly swatter. Some like to use liquid or aerosol insecticidal sprays to kill the spiders, and they work fairly well, most of them, but it takes a while for the spiders to die and they are none too happy in the process. Be careful that they do not have opportunity to bite as they try to escape.

While it is true that some Arizona spiders are truly venomous, there are many more that either have no venom or their venom is not a serious threat to humans. By being aware of which are and which are not a credible threat, we can learn to enjoy the desert creatures and protect ourselves as well.

# Summer Heats Bring Stress to Plants

Here in the desert, one thing is for certain. Sooner or later summer temperatures are going to stress our outdoor plants, especially if the monsoon rains come late.

Summer heat stress in plants is caused by a lengthy, on-going exposure to the high temperatures and low relative humidity that are typical desert conditions during the early summer months of June and July. Extended temperatures over 110°F and humidity readings consistently below 20 percent can seriously weaken or fatally injure even the hardiest of garden and landscape plants.

High temperatures heat the plant quickly. If the plant tissue heats up close to or beyond its tolerable limits, the tissues of the leaves and branches can be stressed or damaged. Even just a few degrees of temperature can make a huge difference in the amount of stress that a plant must endure.

Low humidity conditions, such as are commonly experienced during the month of June, can be stressful to plants because of the huge difference in water concentration between the inside and outside of the leaf. The process of diffusion, the same process that evaporates perfume from an opened bottle and spreads the smell throughout the entire room, pulls the water from inside the leaf to the outside. The lower the humidity reading, the greater the potential for water loss.

Heat stress and rapid loss of water from the leaf tissues together can cause the plant to become water deficient in a relatively short period of time. This is why we must water more frequently in the summer than we do during the cooler months.

Trees have remarkable powers to survive water stress. When there is insufficient water inside the plant to continue transpiration, the plant tries to compensate by drawing water out of plant tissues in other parts of the plant. Left too dry for too long, however, the drying or desiccation will seriously weaken the plant. When desiccation passes the point of no return, death occurs.

Plants cool themselves by evaporating water through the many stomates, tiny holes, that exist on the undersides of leaves to allow air into the leaf and water vapor out. This process, the process of transpiration, acts like a mini swamp cooler and helps keep the tissues of the plant from overheating. Water must remain in continuous flow from the lowest roots to the highest leaves in order for this to occur, however. Any interruption in the flow of water could spell disaster for the tissues on the far ends of the pipeline. We have to water on time, generally every five to seven days with a flood irrigation system, in order to prevent damage to plants.

Once the late summer monsoon storms begin, the amount of evaporated water in the atmosphere climbs significantly and the temperature of the air often hovers between 100 and 107°F. These lowered temperatures and higher humidity levels greatly reduce the stress on plants and they often quickly recover if they have not been seriously damaged during the dry months. If the monsoon is delayed, however, the plant labors under extended potentially harmful conditions and the continued stress over long periods of time can spell big trouble.

Fortunately, proper variety selection before planting and good management year round can help prevent unnecessary damage to landscape and garden plants. Summer heat stress can be minimized by carefully watching for water stress symptoms and then quickly and promptly giving the plants a proper irrigation.

Wilting of leaves is the most common symptom and is usually the first symptom to be seen. Temporary wilting of plants during the hottest part of the day, especially in plants with large leaves like squash and cantaloupes, is usually not a serious problem. However, when plants start the day off wilted, or wilt quickly in the morning hours, these are problems that should be quickly addressed. Slow, deep irrigations are best to soak water down into the lower root zones of plants. Be sure to cover the entire area underneath shrubs and trees to ensure that a majority of the roots are receiving water.

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Now, let's talk about some of the specific water-related problems that are often seen during the summer months. The first is severe desiccation, or drying of plant parts. Desiccation is usually seen as wilting and drying of leaves. Sometimes the leaves will turn yellow and fall off the tree before they can turn brown. The yellowing leaves are usually scattered throughout the plant canopy hither and yon without any pattern.

Sunburn symptoms can also be quite prevalent during the summer. We have already seen numerous cases this year from samples that have been brought into the plant clinic at the Extension office. Sunburning of leaves causes a bronzing or yellowing of sun-exposed leaves and shrinking and drying of smooth bark surfaces. Sunburn is most often seen on the south and west sides of the tree.

Another water related problem is iron chlorosis, or yellowing of leaves due to a lack of iron. It is often linked to trees that have been over watered.

Iron, an essential nutrient, becomes lacking when plants cannot absorb enough of the mineral to meet its needs. Soils that remain consistently wet aggravate the inability of the plant to pick up the nutrient. The solution is to irrigate when the soil at a depth of six inches is partially dry but still somewhat moist. Take a handful of soil from the bottom of the hole and squeeze it into a ball. For medium textured soils, irrigate when the lump of soil becomes crumbly around the edges when you release your hand. Sandy soils will require more frequent irrigations.

Applications of a chelated iron fertilizer applied either to the leaves or to the soil may help in greening up iron deficient tissues. To tell if a plant is iron deficient, check the leaves. Leaves that start to turn a pale yellow over the entire leaf but have the veins in the leaf remaining green usually have iron chlorosis.

Another problem caused by too much water are the root rot diseases. Phytophthora, Rhizoctonia, Pythium and Phymatotrichopsus are big names for big-time problems in many plants. Roots usually rot when one of these organisms invades and starts feeding on roots in constantly wet soil. As feeding occurs, the outer part of the roots become mushy and slough off. Wilt symptoms are usually the first hints that something is happening below ground. Avoid the temptation to water until you check the roots for signs of disease. Adding water to diseased root systems only makes the situation worse. Check the soil at a depth of six inches before irrigating to see if the soil seems overly wet. Dry soils tend to decrease fungal activity.

Finally, a common symptom of water stress is the splitting of citrus and pomegranate fruit after an irrigation. The cause is usually mechanical. Hot, dry weather slows the growth of both the juicy, inner fruit and the outer rind. Later when conditions ease and growth resumes, the inner part of the fruit expands faster than the rind resulting in ruptured fruit. Other than making sure that the trees are well fertilized and watered throughout the entire growing season, there is not much that a grower can do to prevent this damage.

If we understand the basics of summer heat stress, we can take the proper steps to minimize the stress or avoid it all together.



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# Using *Acanthus* as a Landscape Plant

The avid landscape gardener is always on the lookout for new plants that can give subtle, unique flavor to outdoor areas. One such plant is *Acanthus*, or bear's breech.

The genus of plants called *Acanthus* is a group of some twenty different species that originated in the Old World temperate regions of southern Europe and the Mediterranean. The plants are mostly hardy, herbaceous perennials with large, broad, deeply-lobed leaves. The plants grow vigorously, up to three feet across, and come back every year from the roots and crown. In Europe, it is thought that they have been favorite flowering plants in gardens since Roman times.

There are three species that will flourish under our low desert conditions. Each provides enough variety that they can separately, or together, add color and interest to a landscape. All three share in common deeply lobed leaves that add interest to the landscape decor. One species has spines on the leaves, which could be an issue in some locations.

The smallest of the three, somewhere between two to three feet across and perhaps that high, is *Acanthus balcanicus*, or as it was previously known, *A. hungaricus*. The leaves may be more intricately divided into toothed lobes than the other two species.

The most common species is *A. mollis* and is a little larger than *A. balcanicus*. In full bloom, it may grow up to four to five feet high. The leaves are a glossy deep green and, like *A. balcanius*, the leaves are deeply lobed. The leaves do not have spines.

The final species is *A. spinosus*. It grows to about the same size as *A. mollis*, but its leaves are protected by long, sharp spines. This species would need to be planted away from common traffic areas, such as near a sidewalk or door. The leaves have a silvery color and are deeply lobed like the other species. Some varieties of this species have leaves that are bright green in color.

The flowers of each species are, well, spectacular. For this reason, the plant is valued as a landscape plant. The petals vary from white to a rose color and the bracts, the outside covering of the flower bud before it blooms, are have a delicate maroon or light rose color. These bracts are armed
these flowers are borne and discard them. Not only will you dispose of the thorn problem, but you will also head off the distribution of any seed that would be produced. Since the seeds are mainly distributed by the wind, early pruning and disposal will prevent new plants growing where you do not want them.

In addition to the thorns, *Acanthus* does have a few other drawbacks. *Acanthus* are tough plants with spreading roots that can quickly invade and take over a garden spot. Some gardeners find them invasive, meaning that they spread easily beyond where they were originally planted. For that reason, it is important to give them a lot of room so that you can grub out any new plants that are pushing their limits. It is also possible to limit their spread by containing them with rigid barriers that sink at least ten inches into the soil.

Where should these plants be located in the landscape? Because all species do grow rather large, their exact location will be dependent upon the ability to provide adequate water in a timely manner through the warm growing season, other plants that may or may not interfere with them, and physical access to work the plants as necessary. These plants are often used for backgrounds, along borders, and in areas where subtropical effects are desired. In addition, those without spines on the leaves should work well as a doorway container plant.

All species of *Acanthus* need a rich, light, well-drained soil, and, while the plants can tolerate some shade, full sun is best. It is important to remember that excessive moisture is fatal, especially in winter and spring. While they do need moderate to regular watering, especially in the summer months, they must not be over watered. If the plants either receive too little water, or too much, the leaves can be damaged. Super wet situations could lead to rotting roots.

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An underground tuber is one method of planting new *Acanthus* plants, but container-grown stock is also available. These plants are also easy to propagate from seed. Early spring or fall after the temperatures come down past 100 ° F would be the best times to plant from seeds or tubers, but hardy container plants can be planted any time. If you already have a planting of *Acanthus* in your yard, it is a simple matter to dig up a clump and divide it into two or more plants before replanting them. This is best done between mid fall and early spring.

If you do choose container stalk, and desire to plant in the fall, make sure that you protect them that first winter by placing some type of cover over the plants during frost or freeze events. Young plants tend to be more susceptible to cold weather injury.

There are some reported pest problems. *Acanthus* species are susceptible to aphid infestations. These need to be sprayed off with a strong stream of water. Insecticidal soap will also help keep them under control.

Slugs and snails also find these plants a delectable treat. These critters do not like sunlight all that much and tend to congregate during the day under debris or other protective materials. It is possible to reduce pest populations by laying a piece of cardboard or lumber flat on the ground in the vicinity of the plants plagued by these pests. Then, during the day, it is a simple matter to lift the covering and collect the animals hiding there. There are baits of anti-slug chemicals available, if you prefer. Some organic gardeners trap them by placing a pan or saucer dug into the ground in such a way that the lip of the container is even with the surface of the soil. Placing a small quantity of beer into the bottom of the pan serves to attract the animals. Led on by their instincts, they fall into the pan and cannot escape.

Powdery mildew, a fungus disease, can be a problem in the spring and fall when the temperatures are above freezing and below 90° F. The fungus does not thrive in temperatures above 100°F. For that reason, we only need to watch for the fungus during cooler weather. Sometimes it can be a problem in late fall or during a warm winter. It all depends upon the timing and duration of favorable temperatures. The best solution for powdery mildew is to spray a protective broad spectrum fungicide to prevent fungal growth. Check the label on the fungicide product to make sure it controls powdery mildew. It will tell you how often it should be applied for good control.

*Acanthus* may not be the plant for everyone, especially those that like to put seed in the ground and walk away. These plants definitely will need some tender loving care. For avid gardeners however, the variety, colors, and hardiness of the *Acanthus* species make them an intriguing option for an outdoor landscape.

Acanthus spinosus
Cornell University

Acanthus balcanicus
Wikipedia.org

# Selecting the Right Fertilizer

Citrus, other fruit trees, and most ornamental trees and shrubs need to be fed properly during the months of active growth to maintain good growth and productivity.

All plants need to acquire certain chemical elements from their native environment in order to grow and reproduce as well as we want them to do. Normally, these essential elements will be provided by nature from the air, the weathering of rock particles, and from the decomposition of dead plant and animal remains. That is the way that it is done in wild plant communities.

In situations where the native rock is deficient in one or more of the essential nutrients; or in areas, such as the deserts of Arizona, where the overall amount of decomposed organic matter in the soil is low, these essential elements may not always be available in the amounts necessary for proper plant growth, especially for the pampered plants in our yards. When deficiencies occur, we may need to add extra nutrients to the soil.

How do we select the right fertilizer for the job? Because it can be a little complicated, let's start with the basics.

Of the seventeen elements essential to plant growth, three are provided free of charge from the air surrounding the plants. These are carbon, hydrogen, and oxygen. We normally don't worry about them.

Nitrogen, phosphorus, potassium, calcium, magnesium, and sulfur are used in fairly large amounts by plants and because of this are often called macronutrients. The rest are used in fairly small amounts and are called micronutrients. When the natural environment is deficient of either macro- or micronutrients, they can easily be added with the proper application of fertilizers. Not all fertilizer products are the same, however, so a good first step in selecting the right one for the job at hand is to understand all of the different types available.

One of the first things you will notice when you walk up to the display of fertilizers is that some come in liquid form and other are sold in a dry, granular form. That, and the nutrient value of the product, make up the formulation of the product. Both liquid and solid formulations work well when used correctly.

In general, the liquid forms are used on high value plants, such as tender vegetables and in flower beds. Dry, granular forms are usually the easiest and least expensive way to feed large woody plants and turf. Both liquid and dry formulations will work on any type of plant of course, but because the liquid forms are usually sprayed on the leaves, are more expensive, and are more difficult to apply to tall plants and over large areas, they are generally used on smaller and more tender plants.

When using a liquid fertilizer, be sure to read the instructions on the label before spraying any onto leaves. It has to be done right. You will want to make sure the concentration of foliar fertilizers applied is not stronger than what the label recommends because too much of a good thing could burn the leaf tissue. Applying foliar fertilizers at temperatures over 85° F could also damage the leaves. The label will give you the appropriate use directions.

The majority of fertilizers are sold in the dry powder or granule formulations. These are generally spread onto the surface of the soil within the root zone of the plants, scratched in with a rake, and then dissolved and carried to the roots by a deep irrigation. Some manufacturers will compress granules into stakes which then can be easily driven into the ground with a hammer. These dry particles dissolve when they contact water and, separating out into their basic elements, become available to the plant roots.

Fertilizers are also formulated according to the number of essential elements included in the bag or container. The label will always identify the chemical makeup of the formulation. The three numbers on the front of the bag tell the percentage of nitrogen, phosphorus and potassium in that order. A bag of 10-10-10, for example, will contain ten percent nitrogen, ten percent phosphorus, and ten percent potassium. If there is a fourth number, it will be for a micronutrient carried in the formulation. In our area, that often is iron.

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A complete fertilizer will contain all three of the macronutrients and there will be a number higher than zero in each of the three locations. An incomplete fertilizer will contain less than three nutrients and a simple fertilizer will contain only one nutrient, such as ammonium sulfate, 21-0-0.

Some gardeners may opt for a USDA organically approved fertilizer. This information will be marked on the package for those that are sold at stores or online. The nutrient percentages contained in these fertilizers will also be provided, just like they are for the other fertilizers.

In Southern Arizona, nitrogen will almost always be lacking in soils and most general fertilizers will include this element. In many cases, this will be the only nutrient needed on a regular basis because most local soils generally contain sufficient phosphorus and potassium. Occasionally, in some soils, it may be necessary to add phosphorus, perhaps every third or fourth year. Two common incomplete fertilizers are ammonium sulfate, 21-0-0, and ammonium phosphate, 16-20-0. Rare is the situation where the third number, potassium, is needed in Arizona soils. For this reason, complete fertilizers are not often needed by plants growing in native soils.

If an application of iron is needed, select a formulation, either liquid or dry, that will provide the needed element. Chelated forms of iron work best in our environment.

Urea is a nitrogen fertilizer which requires extra care. It is a good fertilizer, we just have to be careful in the amounts applied. The reason is that it is forty-six percent nitrogen with no phosphorus and no potassium. Containing more than double the amount of nitrogen found in ammonium sulfate, it can easily burn roots of plants when applied at the normal ammonium sulfate rate.

There are fertilizers with many different nutrient ratios on the market. It is important to remember two principles when selecting a fertilizer ratio. First, the higher the number in the analysis, the stronger or more concentrated is the fertilizer. Second, the higher the concentration, the less should be applied at one time. Most recommendations for fertilizer applications to landscape and garden plants indicate that at least three applications per year should be made, never just one. This is for both plant safety, and to minimize the loss of fertilizers below the root zone through leaching.

Slow-release or controlled-release fertilizers are balls of beadlike granules of complete fertilizer coated with resin, sulfur or some other permeable substance. When the granules are moistened, as during a normal irrigation, some of the fertilizer diffuses through its coating into the surrounding soil. Every time water is applied, this is repeated until the fertilizer is used up. Some products are effective for four months; others for up to eight months or longer. Slow release formulations are generally used for container plants and when planting trees and shrubs.

Understanding how to select the right fertilizer for the specific task at hand can save time and money as well as prevent unnecessary injury to the plant.

If you have questions about this newsletter, have any plant related problems, or wish to have a publication sent to you, please call (520) 836-5221 x204 or (520) 374-6263 and leave a message. If you have a plant problem and are able to email a picture, please send a picture with any information you can provide about the plant and your contact information to our diagnostic team at macmastergardener@gmail.com and a Master Gardener will contact you.

This newsletter is available to view on our website at: http://extension.arizona.edu/pinal

Richard D. Gibson

Extension Agent, Agriculture

RDG/te/sh/aw

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