

THE UNIVERSITY OF ARIZONA Cooperative Extension

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PALO VERDE ROOT BORERS

If you see a large, three-inch, black to dark brown beetle hanging out around your home, don't get concerned. It is relatively harmless and shows up only once a year.



These large beetles have been reported this past week from various parts of Pinal County. We call them locally the palo verde root borer because of the number the immature stage does to the roots of the palo verde tree but they also feed on many other broadleaf trees and shrubs. Because of their size, some people find them scary; but other than their ability to bite you, or a pet, if a finger, toe, or nose comes in close contact with their head, they are harmless. If you want to pick them up for inspection, grab them behind the head. They are really quite interesting.

The palo verde root borer is the common name of a species of large beetle that lives in the desert Southwest. It has had several scientific names over the years as scientists have studied them but, because it seems to like best the palo verde tree, we tend to call them by that name. It is a large family to which this one species belongs and relatives can be found in both cold and warm climates in North America.

Palo Verde Root Borer

Adult

They are not cockroaches, let's get that clear from the very start. These beetles have long, segmented antennae and a "collar" of spines behind their head. You do not have to even get close to them to tell the difference. The beetle lives out in the wild while cockroaches are tied almost exclusively to the human domain.

These adult insects are usually seen first in early summer and hang around through the hot summer months. A single adult beetle may live up to a month but they usually do not last that long. They do not eat, but depend upon the energy that they store up in the larval stage underneath the ground. The adults are active mainly at night and their sole function is to mate and lay eggs. The female deposits eggs in oval-shaped holes beneath host trees at a depth of two to three inches. The adults may live for a short time afterward, but they usually die fairly soon after completing the reproductive cycle.

Upon hatching, the small, cream-colored larvae make their way to the root system of the tree and begin to feed. If the root is large enough, the larvae bore into the center of the root and move toward the trunk crown as they feed and

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grow. Finding a smaller root, they may move along the outside of it until they reach a root large enough to accommodate their size.

The larvae remain in the root system for three or more years and their only function is to eat and store energy needed for when they become adults. The full grown larvae will be three to four inches long before pupating, their next growth phase. After they go through this resting stage, they will emerge as adults, usually in the months of June and July.



Palo Verde Root Borer Grub

Because of the length of time that larvae spend in the roots, and because of their relatively large size, they will consume significant amounts of root tissue. They have voracious appetites and seem to feed constantly. The most common symptom of root borer damage is when large branches of susceptible trees die back, often clear to the trunk of the tree. When we see one

branch dying at a time, our first thought is palo verde root borer.

While the symptoms of feeding are mainly seen in the limbs, the real damage to plants is mostly confined to the root system. It is the damage to the roots that causes the symptoms up in the canopy of the tree.

There is some good news. Unless there are many beetle larvae in a particular plant's root system, symptoms may never actually show up in the above ground parts of the plant. A healthy plant, unless, once again, there is a particularly large population of larvae feeding upon the root system, can usually produce enough new roots to offset the damage caused by the beetles. In such cases, you may never know whether or not there are larvae attacking a particular tree.

The same is not true of plants that are stressed or already injured or diseased. There is some new evidence that trees in poor condition may emit an odor that attracts wood consuming insects and that may also be the case with this beetle. In these cases, the actual death or decline of plants or specific limbs of plants may only be hastened, and not necessarily caused, by the palo verde root borer. Perhaps the insect is not the villain that we sometimes paint it to be.

These beetles rarely enter homes. Unlike other insects, such as the cockroach, they do not want to be inside. Because they are attracted to light, they will sometimes enter an open door or window. Often we find them dead on the porch or under a window where a light has been left on all night. In their confusion, they have been known to slam themselves into a lighted window or door with such force that people are startled by the sound.

Just be aware that palo verde root borers feed on other plants besides the palo verde. We have found them in the root systems of mesquites, roses, privets, elms, cottonwoods, mulberries, citrus, and stone fruit, like peaches, apricots and plums. In fact, they can feed on many more species than are listed here and borers have been found on most broad-leaf trees and shrubs at one time or another. They do not seem to feed on palm trees, agave plants, bamboo, or other plants with parallel veins in the leaves.

Unfortunately, there are really no effective control measures for the palo verde root borer. Insecticides that are currently on the market are simply ineffective against these animals. Once they are inside a root, contact or soil-applied insecticides can't reach them and systemic insecticides that are absorbed by the plant don't seem to work very well either.

The best way to prevent palo verde root borer damage, as I mentioned before, is to ensure that all broadleaf trees and shrubs are kept in good health and condition by watering and fertilizing them appropriately. A healthy, growing tree that can outgrow the damage that these insects inflict is the best solution available.

Sometimes people wonder how long the grubs will hang around in the soil after an infested tree or shrub dies or is removed? That is a great question. If there is a susceptible plant nearby, they can migrate to that plant, especially if there is an attractive root nearby. I once thought that without a food supply, the insects would quickly die but recent research indicates that might not be so. For best results, I would replant a palm tree or agave in that location.

Now is the time for the annual emergence of the large adult beetles of the palo verde root borer. Just like the arrival of 100° weather, palo verde root borers are a sure sign of summer.

UNDERSTANDING THE DIFFERENT MESQUITES

If you are looking for a desert-adapted shade tree, you might want to consider one of the mesquites.

The native mesquite is familiar to many of us because it is so common, not only in its native environment, but also in urban areas. There are, however, other types of mesquite and some of those can also be planted in our area. Let's take a look at these different types of mesquite, how they stack up as landscape plants, and the uses for which they are best suited.

Just so we are clear, mesquite trees and shrubs are not really low, low water-use trees and shrubs. They do grow well in our low desert and they can survive in low water-use landscapes but they actually do require more water than, say, a palo verde or ironwood tree.

Just think about where they grow naturally. In the low desert, mesquite trees are mainly found along rivers and streams where they form dense stands. These trees grow there because water from the free-flowing streams permeates the soil so that the trees can find it with their roots. These trees are not located up on the slopes in the low deserts. That is where the palo verde trees grow. Needing more water, the mesquites are down by the streams.

Yes, I know. Mesquite trees and shrubs have become quite invasive in the grasslands of Arizona and the other Southwestern states on slopes and in other areas where there are no flowing streams. The reason is that the desert grasslands are generally located at about 3,500 to 5,000 feet elevation and in Arizona, for every one thousand feet gain in elevation there is, in rainfall normal years, about five inches of rain that falls. At 4,000 feet elevation then, a normal rainfall year would yield about fifteen to twenty inches of rain. Here in the low deserts with elevations at about 1,000 feet, we can expect only about five to seven inches. It is because of the extra rainfall that mesquites can survive away from streams.

Of course you will find information in many references that say a mature, well-established mesquite tree will require little if any additional water. In normal rainfall years, that may be true. In today's drought, I am seeing many mesquite trees with a stressed look and showing drought-type symptoms, not only in the wild but also in urban areas.

If you look carefully at the mesquites growing in town, you can tell which ones are getting enough water and which ones are short. While they will not need a lot of extra water, such as an ash or mulberry tree, they do need an occasional drink of water that is sufficient for the water to sink about three feet into the ground. A good soil probe will help determine if irrigation water is being properly applied.

Before planting a mesquite tree, it will be important to decide whether our budget and/or inclination will allow us to spend a little extra on water for a mesquite tree. Other considerations include the height and width of the tree and the amount of shade desired. If you really want a mesquite in your yard, the several different types of mesquite will allow you to choose one to match the conditions of your yard, and your desires.

There are six different mesquites that are generally planted in Southern Arizona landscapes. Some are familiar and some may seem like strangers to you. Some are fairly large and some are smaller plants. Some provide dense shade and others a more filtered shade. Let's take a brief look at each one, just to know our options.

Let's start with the familiar native mesquites. While there are several that are listed as native, there is only one that really is common to Pinal County. That mesquite is the velvet mesquite, Prosopis velutina.

Velvet Mesquite

The velvet mesquite can grow up to thirty feet tall and as wide. It will remain smaller and more of a shrub when given less water, or grown in difficult soils. The bean pods have been used for thousands of years as a food source and many people today are harvesting them off the tree and hammering them into a healthy flour. Given sufficient water, the velvet mesquite gives dense shade. This tree and other

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mesquites should not be planted next to a house or property line because it could soon start scraping on singles or hanging over into the neighbors property. They might not like that. Select a planting site that is at or beyond half of the expected width of the tree. For example, if the tree is expected to grow to twenty feet in width, select a site that is about ten feet from a sensitive area.

The other mesquite that is relatively common in the southeastern part of our state is the tornillo or screwbean mesquite, P. pubescens. This mesquite will grow to twenty to thirty feet height and width. Generally it is a smaller tree than the velvet mesquite and sometimes is more of a shrub in places where it is not really native. I have seen them do well in Pinal County. It is named screwbean because the seed pod is a tightly wrapped spiral. This arrangement gives it its descriptive name.

Another common mesquite is the honey mesquite, P. glandulosa. There are two varieties of this plant; one that is native to Texas and one that is normally found further west. This tree will grow to a size of between fifteen and thirty feet. With larger leaflets, it tends to be a more showy plant and many think the leaves look more fernlike than the other mesquites.

I find the black mesquite, P. nigra, particularly interesting. It is one of three mesquite plants native to South America that are found here in Arizona landscapes. It is closely related to the Argentine mesquite, P. alba, and has the same kind of large and stout thorns that make these trees formidable. Its size is smaller, twenty to thirty feet in height and spread, with short, tightly packed leaflets which tend to make it a good shade tree. I would place it in a low traffic area.

The Argentine mesquite is a larger tree growing to twenty to forty feet wide and high. It tends to have the stout thorns previously mentioned. To reach the larger size, it will need to have extra water. The thorns make it a plant that probably should be located away from areas where people gather. This tree is a good shade tree.

Many people choose the Chilean mesquite, P. chilensis, because it tends to have small to no thorns. It gives filtered, more open shade which some people find preferable. It will grow up to thirty feet high. It common to find it growing in Arizona landscapes.

You need to think about the thorns of the mesquites before you plant. Sometimes you want them, sometimes not. While some mesquites have formidable thorns and others are more friendly, please remember that mesquites are good at cross pollination. This means that they hybridize easily. Some trees that you think are Chilean mesquites can end up with big thorns while a labeled Argentine mesquite may have no thorns. Go figure.

In addition, there is a lot of variability between trees in the same species. Some velvet mesquites produce seed pods with an extra sweet taste while others may produce beans that taste like cardboard. If you are looking for specific characteristics in the mesquite of your choice, just be aware that seed-grown trees may not be exactly like their parent.

Most mesquites are relatively free from major pest problems. There is the mesquite twig girdler, an insect that chews through and girdles all the way around a branch. Every part of the branch beyond the girdle will die leaving a highly visible dead branch. Unless there are a lot of these insects on one tree, we tend to disregard the damage as normal. Mesquites are also highly susceptible to mistletoe invasion.

With all of that said, mesquite trees can play a major role in any desert landscape. They are versatile. They give good shade, and some people even use their seed pods for food. If you are looking for one tree that can fulfill a number of different roles in the landscape, you might want to consider one of the desert-adapted species of mesquite.

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Chilean Mesquite



Honey Mesquite



SUMMER PRUNING

While summer is not the best time to cut big branches from trees and shrubs, there are a few summer pruning tasks that can safely be done.

Most of us agree that major pruning jobs should be done during the cooler months when the stress of hot weather has moderated to a more pleasant time outside. During the winter, most trees slow down in their internal machinery, and take a snooze. Trees that lose their leaves mostly shut down their biological functions and those that do not function at a much reduced rate.

In the winter, sap within the plant generally stops moving. The rate of water loss through the leaves, transpiration, quickly declines as temperatures drop off. The demand from the various parts of the tree for energy decreases. It just makes sense to schedule pruning activities at a time when stress on the plant is minimal. It is healthier for the plant and more pleasant for us.

Sunburn is another reason to delay most pruning until the cooler months. During the summer, the sun is almost directly overhead and sunlight travels a more direct line from the sun to the earth. Because of its intensity, sunlight has the capacity to damage sensitive and exposed plant tissue, including the bark. In the winter as the sun appears to move south, the distance of travel through the atmosphere becomes much longer. For this reason, the sunlight is more filtered and has less capacity to do harm. Don't get me wrong, there is still potential for sunburn of tender exposed bark during wintertime, but it is much less than during the summer.

Another reason to delay most pruning until the winter season is related to photosynthesis, the process of capturing and storing energy for the plant. During the summer, photosynthesis is occurring at peak rates and any removal of wood or leaves at this critical time could mean that the plant might not be able to create sufficient levels of energy to maintain its overall health. Pruning during the winter helps ensure that the energy-related processes are not interrupted.

However, with all of that said, there are times during the summer when a touch up here or there might be in the best interest of the plant and the gardener. Let's talk about some of those times and also touch on proper procedures.

Some trees respond well to pruning in the early spring and late fall, rather than during the winter months. Included in this group appear to be our desert trees and shrubs with mesquite trees being a prime example. Ironwood and palo verde trees would also fall in this category. While some professionals recommend pruning these plants anytime during the summer, others feel that pruning should be done only during the early spring and late fall. They feel that it places less stress on the plants. I tend to go with the spring and fall recommendation when temperatures are below 90°F because I tend to err on the side of safety for the plants.

Sometimes vines, shrubs, and other fast growing plants just get out of hand with their growth and some corrective pruning is necessary. Our queen's wreath vine is a good example. It just grows everywhere. For this and other fast-growing species, it is generally okay to prune them back from time to time to keep them in their place and to thin them out. Just make sure that the cuts are done correctly, at a 45° angle across the stem, and just above a bud to promote new growth. Also, do not take a lot of plant material out at any one time. Several light thinning events is much better than one heavy pruning during the summer.

At times, the canopy of the tree becomes so dense that it becomes like a sail in heavy winds and damage can occur during our summer monsoon storms. From time to time, it may be a good idea to lightly thin out some branches so let the wind pass through. Choose small and slender branches over large, major branches to reduce damage to the plant. I recommend that any branches removed should be no larger than the width of a pencil. Also, the branches selected for removal should come from several places throughout the tree, never all in one spot. This will promote air flow and leave enough shade to help protect tender bark from sunburn.

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Fruit trees that lose their leaves during the winter are also candidates for a gentle summer trim. I am not talking about large branches here, especially during the fruiting season. These trees need just about every leaf to produce top quality fruit. However, new growth that appears on the sides of scaffold branches, that is obviously in the wrong place, can be removed while small by carefully breaking off the new growth at the base of the stem. Doing this will help keep the center open and allow greater air movement and the entry of sunlight which are important to good fruit production. It will also help reduce the work load when full-scale pruning takes place during the winter.

Dead and diseased wood can be removed at any time. Since these can lead to problems down the road, the quicker they are removed the better. The same goes for any new sucker growth that sprouts from the base of the trunk. These can be pinched or rubbed off while they are still small.

The rules of pruning are the same for the summer as they are in the winter and there are three that are super important. The first, and perhaps most important rule, is to never over-prune a plant. The second important rule is to never leave stubs of wood that can be infected by disease or invaded by insect pests. The third rule is to make the cuts in such a way that easy healing is promoted.

Because perennial plants store energy in their branches, twigs, and roots, it is important to not steal away their hard-earned work by removing too many branches. For various reasons, heavy pruning can threaten the long term health of trees and shrubs. The best rule is to never take more than one-third of the branches at any one time.

The second important rule is to never leave stubs upon which one could hang a hat. The stubs are open invitations for the invasion of heart rot disease fungi and wood boring insects. A proper pruning cut will leave the collar of the branch in place and yet remove all of the branch's wood back to its point of attachment. The collar of the branch is important because it is the location of specialized cells that divide quickly and promote the healing process.

Finally, it is important that the cuts promote healing of the pruning wound. Jagged cuts and stubs of wood left behind make it difficult for the plant to cover the wound with new tissue. We do not want a cut surface to look like it was chewed off by a beaver or some other animal. For smooth and cuts and surfaces, it is important to use the right tool for the job and to make sure that the tools are sharp. Larger branches may require a lopper or a pruning saw to do the job correctly.

Many people think that pruning is a job for cool weather, and they are mostly right. There are some cases, however, where summer pruning may be beneficial. To do it right, there should be a good horticultural reason to do the job and, it goes without saying, that the job must be done right to protect the health of our trees and plants.

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VERTICILLIUM WILT DISEASE

Dying leaves and dead branches in June may mean that verticillium wilt fungi were active in your yard back in January.

The first part of the name, verticillium, is the genus, or scientific name of the fungus. The second part of the name, wilt, is the major symptom seen in susceptible plants. It has no effect on pines, junipers, palms, or grassy plants, so no worries there. It also does not seem to bother citrus, pyracantha, eucalyptus, mulberry, oak, and oleander. That is the good news.

The bad news is that there are many, many plants that can be affected by this disease. Some of the more common landscape plants susceptible to this disease include olive, Chinese pistachio, ash, pecan, carob, almond, apricot, peach, the California pepper tree, elm, rose, and privet. As if that were not bad enough, other susceptible plants include tomato, eggplant, okra, chrysanthemum, geranium, petunia, stock, and sweet peas. Now, this is only a short list. There are many other plants at risk. With the list of susceptible plants longer than the trunk of a giant sequoia, is there any surprise that the disease is so common in the desert Southwest?

With that said, I do not want to leave you with a hopeless feeling. There are plenty of examples of susceptible plants surviving for many years without developing symptoms. One thing that is in our favor is that there is some host specificity.

Host specificity means that the type of verticillium fungus that affects roses typically will not attack olive, and vice versa. This separation and variability among the various types of verticillium means that a sick plant of one type growing next to a different type of plant in the yard does not necessarily mean that the healthy tree will become infected. That is good news because verticillium wilt is a tough disease to fight and can be quite devastating if it gets a toehold in the yard. Still, it never hurts to keep an eye on your plants. In the world of biology, anything might happen.

So, just what is this monster that lies lurking in our soils? Quite simply, it is a fungus that clogs up the water conducting tissues of susceptible plants. When the tubes that conduct water and nutrients from the roots to the topmost parts of the plant fail to deliver during the hottest part of the year, the upper parts of the plant can quickly die from lack of water. The disease also produces harmful toxins and enzymes that can have a negative influence on the plant.

The symptoms of verticillium wilt are similar to other plant conditions so it is not always easy to pinpoint the true problem. However, since the disease clogs up the tubes that conducts water, we should expect that an interrupted supply of water would create drought symptoms in the affected plant. That is absolutely what happens. Common symptoms include wilting and browning leaves just before the affected branch completely dies. Earlier symptoms include yellowing, curling, and drying of leaves. When water is applied to help solve the problem, the symptoms do not go away. That is an important clue that it is not water stress alone that is causing the problem.

Another key symptom is discoloration of the center parts of the trunk, branches, and twigs of the plant. The discoloration appears to be brown or grey in color and the pockets of strange color can be irregular across the wood. One common diagnostic procedure is to take a sharp knife or pruning shears and cut at a diagonal across the branch to look for the telltale color changes. Unfortunately, in some affected plants the discoloration is less pronounced as in others. In Chinese pistache, for example, the discolored vessels are striking. In other plants, the discoloration can be difficult to see.

One other common symptom is the smell. Several years ago, I was delighted to receive a cross section of a Chinese pistache trunk that died from the disease. Some people collect memorabilia. I like to collect specimens of sick plants. I know, that seems strange, but I find them intriguing and they make good teaching examples. In this case, the sample was classic and I was anxious to add it to my collection.

As I intimated before, the smell was, well, let's just say it was interesting. It was so bad that my less than enthused associates in the office told me that it reminded them of worn socks that had not seen the inside of a clothes washer

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for a long time. They insisted that I toss it out. "Get rid of it," they said! I thought that was a little harsh but I did take it outside and put it in a safe place until the sample dried out, the smell evaporated, and it was safe to bring it back in. If there is a foul-smelling odor in the wood of a dying plant, it might be caused by verticillium wilt.

The disease agent has the ability to hide in the soil for many years waiting for an opportunity to invade and take over a host plant. As the disease runs it course and the plant dies, the fungus produces reproductive structures and hides them in a protective coating. These are often called "resting stages." They give the fungus the ability to reside in the soil for years, decades, even centuries until favorable conditions cause it to start up once again. For that reason, the disease can show up unexpectedly to wreck its havoc and most would not even know that it was there.

The disease seems to be most active in the cooler months. January seems to be the time when temperatures are correct for the disease to wake up and do its thing. It invades from the soil through the roots and into the vascular tube where it can spread quite rapidly throughout the plant. While it grows and develops generally during the cooler months, the symptoms that tell us something is dreadfully wrong tend to show up in the summer, usually June. This all makes botanical sense, of course. The plant's peak time of water use is during the summer months. If the plant is in desperate need of water, and the water cannot pass upward through the conducting tubes, the parts being shorted will go into water deficit and begin showing the drought symptoms previously described.

Verticillium wilt is a devastating and difficult to control plant disease. Once it is inside the plant, there is not much that can be done to get it back out again. If and when the symptoms appear, it will be important to trim off the affected, dead branches to keep the tree or shrub looking the best it can. Since the fungus is found in the ground, it is best not to replant a similar plant into the same hole. Switch it up with a palm or other plant that is not affected by the disease. Good plant nutrition and proper irrigation can also help a plant stay at his healthiest best to hopefully ward off infection.

For annual plants or small perennials, sometimes the best recourse is to simply pull them out and replant with something else. If you can, select a variety that is resistant to the disease. Tomatoes, for example, are highly susceptible to verticillium wilt, but fortunately, there are resistant varieties available. Look on the label for the three initials "VWR" or, "verticillium wilt resistant."

An understanding of the disease, coupled with the right plant selection will help prevent damage and death to susceptible plants in your yard.

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 <u>macmastergardener@gmail.com</u> and a Master Gardener will contact you.

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RDG/te/sh/aw

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Successful Desert Gardening Series

This will be a practical, in-depth view of the principles required to grow healthy outdoor plants in the desert southwest. Get answers to your gardening questions. The cost of the class is \$10 per person, paid by cash, check or money order. (Sorry, cannot accept credit cards). Space is limited, so please RSVP to save a seat by contacting either BJ Seemuth at (520) 431-6167 bjseem@cox.net or Theresa Ellsworth at (520) 836-5221 x202 tellswor@cals.arizona.edu

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