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College of Agriculture  
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## The State of the Stately

### Campus Arboretum Trees After the Winter Freeze

By Tanya M. Quist, Campus Arboretum Director

What a welcome Mother Nature has given to me in my first two seasons in Tucson! I arrived in the worst of the summer heat last year and I've witnessed record cold temperatures this winter. Despite the shock, I'm thankful to have experienced the worst of both extremes knowing my eyes are now wide open to the remarkable range of environmental conditions our Campus Arboretum plants must endure. My Ph.D. research focused on plant environmental stress responses but I never imagined my experiences in this short time here could teach me so much more about the realities to which plants in the Southwest must respond. (Unlike us, plants can't escape to shady homes pumped full of wonderful conditioned air.) Unfortunately, the prognosis for many of the grand and stately trees in our collection is still unclear. Almost half of our heritage trees are in the high risk category, dozens of exotic and interesting trees were severely damaged and even some landscaping staples show major die-back in the canopy. Without question the loss will be significant, but I believe the opportunity for our education is even more significant. These campus trees are an experiment in desert horticulture. From observing and documenting tree response to environmental conditions, we have always drawn conclusions about what will grow well here and what does not. This winter has effectively provided a harsh selection process that may leave some gaps in our landscape but these are gaps ready to be filled with new more sustainable choices. I've already begun a wish list for many new trees with great potential to last through the next 100-year winter as well as the intense heat and drought of the many summers ahead. With your continued support, you will see these grown and planted here in the future. I'm grateful to be here for such a time as this, to participate fully in the uniquely important role of coordinating the activities of so many campus groups with stakes in the UA landscape. Please consider supporting our efforts through membership or gifts that will allow us to not only provide the best plant choices during landscape development but also to create opportunities to engage students in developing a landscape their children and successors will enjoy.

The largest of the Fever Trees was removed in May as a result of severe freeze damage. Other Heritage trees continue to recover and will be assessed after monsoon for maintenance needs.



*Acacia xanthophloea*, the Fever Tree

# Effective Watering for Winter Recovery

By Elizabeth Davison, Consulting Arborist

Winter 2011 will be remembered in southern Arizona as the winter of the Big Freeze. After clearing up all the melted succulents, folded cacti, and fallen leaves, we might have thought the worst was over. However, the severity of the loss may have been worse as a result of the very dry winter. A very dry winter threatens the recovery of trees as well. Trees must have enough resources to recover and re-leaf, and resources mean water and nutrients. Root health is the key to good foliage growth. Particularly during the warming, windy spring season, it's important to apply good efficient irrigation. Even native trees will benefit from at least one long, slow soaking before the heat comes on.

The most efficient way to apply water to trees is to thoroughly soak the soil to a depth of 3-4 feet and then to wait until the soil is dry before watering again. To know how deep the water has soaked in, stick a probe of metal (a rebar or a long screwdriver or something similar) down until

you can't push it any more. This depth indicates the dry soil. Surprised? Sometimes our soils get watered on top, but they can be dry just beneath the surface. You want to be able to stick the probe to 3-4 feet after an irrigation.

A tree can be thought of as having a structure similar to a wine glass. The width of the base is important. We want to encourage root spread. Tips of the small roots explore through the shady cool soil and take up any shallow rainfall that runs off the foliage. This wide root zone expands to create a stable structural configuration that supports the tree when winds pull on the canopy. Thus, we should avoid applying water near the trunk (which not only is unable to be absorbed, but also creates soft soil at the base of the tree – compromising structural integrity in high winds).

To give our trees the best care this spring, we need to get that water on now. The application method is not as important as the location of the water and the depth to which it percolates.

**Drip:** To effectively irrigate large trees in preparation for regrowth and summer's heat, drip emitters should be able to apply water under the drip line of the canopy. More often than not, they were not placed far enough from the trunk. If this is the case, they can be plugged, or new tubing can be installed so that the water is delivered under the drip line. If there are shrubs or other small plants beneath the tree, their irrigation schedule may not water deeply enough or long enough for the tree. The point is to slowly apply a continuous circle of water where the roots need it, and avoid wetting the trunk area. Application times for tree irrigation should be for several hours – overnight is good.

**Soaker Hoses:** One of the best methods for giving trees a long, slow drink is with soaker hoses. These are spongy and "leak" water out at a very slow rate. Configure them around your tree's drip line, maybe even going around twice. (They are inexpensive).

Hook them together and then to your regular hose. Important - do not turn the water on full force... watch to see how much is needed to send water to the end of the soaker hose, and don't apply any more pressure through the line. Let the water run all night – 12 hours should be enough for a full month's water on most desert trees.

**Flood:** If you have trees that are surrounded by berms, take a look to see if the berm is too close to the trunk – it should be as wide as the canopy to allow water to be applied to the drip line. If you can expand the walls of the basin, do so. (If you have trees that are in water catchment basins, they should NOT be at the low spot of the berm/basin). See if you can make the edge of the circle, under the drip line, the lowest part so that water moves there, like a donut. Apply water slowly, at about the speed of a drinking fountain, and move the hose around every few hours to allow the water to completely soak the "donut" to the 3-4 feet depth around the drip line.

Keep using your probe and water again when the soil dries out so that you can't push down a foot. Trees that are well watered during spring will be able to create new growth and recover from a bad winter. Trees that go into summer with little moisture in their tissues will rarely thrive. Make sure your trees are ready for that heat just around the corner in July!



New growth on a Fever Tree (SE corner of Social Sciences)

I love the water of wells and springs and the taste of roofs in the water of cisterns. I am a dry man whose thirst is praise of clouds, and whose mind is something of a cup. My sweetness is to wake in the night after days of dry heat, hearing the rain.

—Wendell Berry

# Student Leadership and Education

By Chelsea Cox, Plant Science Undergraduate, UA Class of 2011.

UA Students care about the campus landscape. As more students become involved, their knowledge of botany and horticulture grows along with their appreciation, respect, and connection to the University of Arizona. Read on to hear from our students what the UA Campus Arboretum means to them.

Study nature, stay close to nature. It will never fail you.

— Frank Lloyd Wright



#1673: just one of the thousands of metal tree tags on campus



UA students tagging trees on campus



UA students representing the Campus Arboretum on Earth Day 2011

Did you know that most of the trees on campus have a small metal tag containing a unique number that identifies each individual? Or that the campus is home to over 8,000 trees? I didn't either until I began working for the Campus Arboretum last spring as a student. That semester, I worked on a long-term project in which I mapped and tagged hundreds of trees on campus, many thousands having already been tagged and recorded by past UA students. These maps and corresponding ID tag numbers have been entered into a database that allows anyone in the world to find these plants in our campus collection and has attracted researchers worldwide who have requested samples and seeds. The public availability of this inventory also invites people from our community to locate and study the trees on the UA campus (to view this public inventory, visit [arboretum.arizona.edu](http://arboretum.arizona.edu) and click on "GIS Map").

In the process of the mapping project and others, I have also benefited since I have gained skills and knowledge that will give me a greater advantage in a tough job market after graduating this year. Working for the Campus Arboretum has helped me memorize the scientific and common names of dozens of species, become proficient in identifying species, learn about database and mapping programs, as well as develop a greater appreciation for the importance of these resources in public education. My interactions with the public through the Campus Arboretum's educational outreach programs has also given me a greater appreciation for the strong ties the UA and the citizens of Tucson have to the environment. Tucson has a great community of tree advocates! (I found this out the hard way—people don't really like it when they see someone hammering nails into trees.) However, I've learned that the Campus Arboretum should continue to increase our reach in promoting tree preservation, increasing plantings, and improving care and maintenance of desert-appropriate trees. I have had so much fun serving the community through the UA Campus Arboretum.

As a graduating senior at the UA, I am thrilled to have another and final opportunity to reach out to the community and invite you to join us **because this semester new things are happening!** For the first time in years, the Campus Arboretum is debuting several new tours that will be free to the public. Our students and staff have been working hard to create new theme-based tours of our campus's amazing plants. Come and learn about trees' roles in sustainability, travel the globe by taking our Trees around the World tour, find out what's in bloom on campus, learn about medicinal plants, go on a tree scavenger hunt and more! Tours are offered every 2<sup>nd</sup> and 4<sup>th</sup> Saturday of every month at 8:00 a.m.

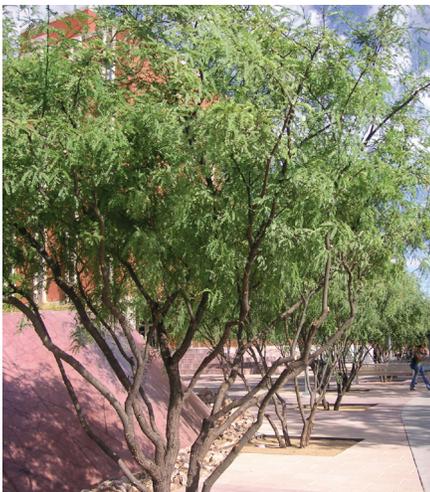
We can't wait to share with you what the Campus Arboretum is really about. Contact the UA Campus Arboretum for more information or to arrange a FREE TREE TOUR by emailing [infoarboretum@ag.arizona.edu](mailto:infoarboretum@ag.arizona.edu) or by calling 520-621-1582.

# Blooming Trees Native to the Arizona Upland

By Julie Wiens, Horticulturalist at the Arizona Sonora Desert Museum



*Olneya tesota*, Desert Ironwood



*Prosopis velutina*, Velvet Mesquite



*Parkinsonia microphylla*, Little-leaved Palo Verde

If we could see the miracle of a single flower clearly, our whole life would change.

— Buddha

Of the 4 deserts of North America—Great Basin, Mohave, Chihuahuan and Sonoran—our Tucson home sits within the Sonoran Desert. Of the seven subdivisions in the Sonoran Desert, we are in the Arizona Upland subdivision. This biologically rich and diverse area is noted for its numerous species of cacti and leguminous trees and shrubs. Legumes have the important role of fixing atmospheric nitrogen into the soil. They do this through a symbiotic relationship with Rhizobia bacteria found in nodules on their roots. Five of the more common leguminous trees and larger shrubs of our local region are listed below.

*Olneya tesota* (Desert Ironwood, Palo Fierro). A thorny tree with dense evergreen foliage of pinnate leaves producing an overall bluish-gray hue. One of the longest living trees of the Sonoran Desert, these can live to be 800 years old. They often drop their leaves during flower bud formation and re-leaf when summer rains occur. A mystical pink/purple hue covers these plants when in flower from April to June with the peak bloom being in mid-May. Seeds produced after flowering can be eaten raw or parched and have a wonderful peanut-like flavor. Biologists have documented hundreds of species of plants and animals whose lives are integrally tied to this icon of the Sonoran Desert

*Prosopis velutina* (Velvet Mesquite, Mezquite). A shrub or tree growing to as much as 55 feet, the Velvet Mesquite has long leaves with usually fuzzy, dull green leaflets. Thorniness is variable and usually lessens as the tree matures. The flowers that bloom in spring are clusters of pale ivory catkin-like blooms about 3 inches long. The mesquite pod was collected, after flowering, by the indigenous peoples and used to make flour. Dense stands of Velvet Mesquite along riparian corridors are called bosques. Some of these mesquite bosques can still be seen along major drainages but many have died because of woodcutting for fuel and the Southwest's rapidly lowering water tables. This tree is deciduous in the winter months. It leafs out in mid-spring forming a great canopy under which you can cool yourself in the hottest of months in the Sonoran Desert.

*Parkinsonia microphylla* (Little-leaved Palo Verde). This species of Palo Verde is found on bajadas and hillsides of the Sonoran Desert region. It differs from the Blue Palo Verde in that it has greener, smaller leaflets and twigs armed with sharp tips. It is also slower growing than the Blue Palo Verde, growing to heights of 20 feet tall or less. The Little-leaved Palo Verde flowers have four yellow petals and one ivory petal, giving it an overall pale-yellow color. The flowering period overlaps and follows the blooming of the Blue Palo Verde. Young seed pods can be eaten and have an oily-sweet taste. Although much shorter-lived than the Desert Ironwood, the Little-leaved Palo Verde is an important nurse-plant for desert vegetation and a home to much wildlife. Growth rate is moderate and its ultimately small size makes this a good choice for tighter landscapes.



*Acacia greggii*, Catclaw Acacia

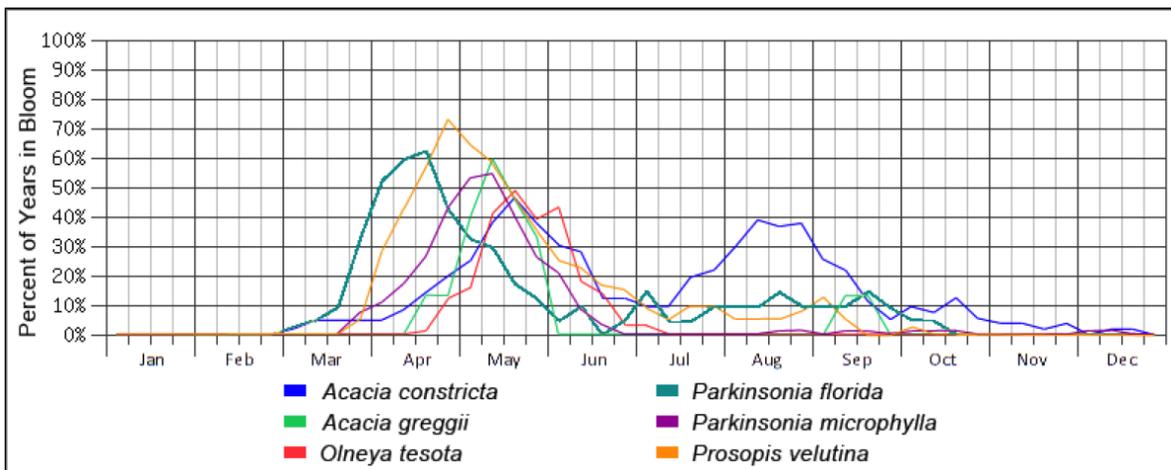


*Acacia constricta*, Whitethorn Acacia

*Acacia constricta* [*Vachellia constricta*] (Whitethorn Acacia, Huizache). Usually a large shrub growing to around ten feet tall, it can become a small tree to as much as 20 feet in deep soil. This acacia has tiny bipinnate, gray-green leaves and gray or reddish colored bark with contrasting inch-long white spines. As the plant matures, thorn production and size diminishes. It is deciduous in the winter, exposing its reddish stems. The sweet smelling flowers are bright yellow balls of stamens blooming in late spring and again after summer rains. A very frost hardy species, this tree has a life span of around 70 years. It can be found throughout much the Arizona Upland, east into the Chihuahuan Desert. This is a great tree for attracting birds and fits into any xeriscape.

*Acacia greggii* [*Senegalia greggii*] (Catclaw Acacia, Uña de Gato). While similar to a mesquite tree in growth form, it is smaller and often more shrub-like. The bark is silvery-gray and the leaves are gray-green and bipinnate. Sweetly fragrant cream-colored flowers appear in April and May and are similar to the mesquite’s catkin-like flower. Branches of this species have cat claw-like, dark, recurved prickles that can easily catch on one’s skin or clothing when passing by the plant. Most often found in arroyos where water is more abundant, Catclaw Acacia can be found from the Salton Sea of California to near the southern tip of Texas. Unlike the other legumes described here, this species does not form the root nodules in association with atmospheric nitrogen. This is a very drought and frost tolerant tree that can live as long as 130 years. A good cover-plant for birds, Catclaw Acacia makes an excellent background plant in landscapes.

Look for these trees around the University of Arizona Campus and throughout Tucson and surrounding areas.



Phenology data showing peak bloom times for Arizona native trees. Courtesy of Julie Wiens, Horticulturist at Arizona Desert Museum.

# What Do You Value?

By Tanya M. Quist, Campus Arboretum Director

What do you see? At the end of the day, it is remarkable to reflect on what I have chosen to spend time doing. Many days these choices seem to be a product of some sub-conscious and perhaps primitive reflex which dictates what I am able to see. In my world and perhaps in yours, there is simply too much to see, too much to process and my less than bionic brain must filter out the things which seem unessential and focus instead on that which moves quickly and demands my attention. However, a ray of light graces the stages of my mind periodically and at these times I must reconcile my budget of time to better fit that which I value. Often the pressing matters are of less consequence than those which silently wait for attention until it is too late. Our redemption lies in our capacity to exercise this consciousness and choose to act rather than be to be acted upon. Education at its best refines this consciousness, extends our capacity to think more globally, to think long-term, and produces the leadership that enables us to be better stewards. The goal of the UA Campus Arboretum is to foster the kind of education in environmental sustainability that inspires conscious decisions to preserve the elements of the landscape which in many cases outlast the buildings, streets and even the people. The trees and the myriad benefits they provide to

Nature's peace will flow into you as sunshine flows into trees. The winds will blow their own freshness into you, and the storms their energy, while cares will drop off like autumn leaves.

— John Muir

the environment and the character of the city and campus will be here for generations of Tucsonans to come. Take a minute to consider their longevity and ask yourself what do you value?

While shooting images of UA olive tree buttresses, Daniel Coates, the photographer of the photo below, was approached twice by pedestrian passersby who inquired as to why he was filming squirrels. Incredulous that they were blind to the beauty of the stately tree that has stood as long as the University and represents exquisite adaptation to environmental and biological stresses, Coates responded, "I'm filming lizards, not squirrels." Thank you Daniel for seeing the trees.



*Olea europaea*, European Olive. Photo courtesy of Daniel Coates.

# Research and Public Gardens

By Tanya M. Quist, Campus Arboretum Director

I've often wondered where we derive our interests. Seemingly similar people often display dramatically divergent specialties and a wide range of varied passions. Within my own family I see examples of these distinctly segregated interests. My husband Bryon, for example, is an audiophile [aw-dee-uh-fahyl – noun ; a person who is especially interested in high-fidelity sound reproduction.]<sup>1</sup>. He recently spent weeks testing out new and better ear phones only to ultimately reach audio nirvana after 5 or 6 pairs were trialed. I, on the other hand, was quite satisfied with the first (and much less expensive) set. Further, all members of our family enjoy hiking near our home in Sabino Canyon yet we each derive pleasure from differing aspects of the journey –some enjoy the physical activity, some the rocks, some the water, and at least one of us sees only the plants (can you guess who that would be?) Drs. James Wandersee and Renee M. Clary of the Earth Scholars Research Group have spent decades defining triggers and human response to the living environment which shed some light on why some see and value plants while others do not to the same degree. In a paper titled "Plant Blindness," these researchers suggest several reasons why we tend to tune out plants<sup>2</sup>: Citing research by Wandersee and Clary, Prakash states that "we don't see with our eyes alone. The data our eyes generate undergo visual processing by our brains. Subsequently, only a small fraction of the total information our eyes detect is brought to our conscious attention."<sup>2</sup> Unfortunately, plants don't move quickly, they don't "entertain or respond to us like animals do" which increases the challenge in seeing plants for most people<sup>2</sup>. How do we relate to a plant that is devoid of standard responses and interactions? The challenge increases as a result of human tendency to cast our gaze at a 0 to -15 degree angle of eye level<sup>3</sup>. Even then data received within this range is filtered or referenced against prior experiences in order to derive meaning<sup>2</sup>. Wandersee and Clary state that "very few things come to our conscious attention unless it has "prior



UA students presented a photographic scavenger hunt to K - 5 students at the Plant Science Family Night held at Ventana Vista Elementary this spring.

meaning" consequently, humans can only recognize (visually) what they already know<sup>2</sup>. What we know of plants is increasingly limited for a population of urban dwellers with limited green and natural spaces available to us. Fortunately, these conclusions allow for the possibility that plant blindness is treatable through both preservation and development of green spaces and education focused on increasing consciousness of the natural environment! Time spent in nature and "the influence of others who appreciate plants, play an important role in the child learning to appreciate and recognize plants too"<sup>2</sup> by conditioning them to the detail and complexity of plant systems. Certainly, the same could be true for adults as well. The need to "see" plants is not only essential to our individual health but also necessary for the health of our local and global ecosystems. Although we tend to see animals, "paradoxically, [it is] plants [that] form the basis of most animal habitats and all life on earth. While animals frequently steal the spotlight where extinction is concerned, one in eight plant species worldwide is currently threatened with extinction. Intellectually, we know that you don't get pandas without bamboo plants, but culturally, this is often forgotten."<sup>3</sup> For this reason, Arboreta play an important role in providing advocacy and education which enhances public capacity to not only "see" plants but to then also appreciate their critical role to our life on earth. This appreciation spawns necessary support for plant conservation and research.

It's one thing not to see the forest for the trees, but then to go on to deny the reality of the forest is a more serious matter.

— Paul Weiss

<sup>1</sup> <http://dictionary.com>

<sup>2</sup> For a good summary of these ideas see: "Plant Blindness: What research says" by Bhavani Prakash

<sup>3</sup> A research paper by Dr. James Wandersee: Towards a Theory of Plant Blindness, at Botany.org



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