

CAMPUS ARBORETUM

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Volume 4, Issue 2

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College of Agriculture and Life Sciences

FALL 2008

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UA Street Trees Shrink University's Carbon Footprint



The results are in! The Campus Arboretum is proud to report data from our Street Tree Inventory, a project designed to assist the City of Tucson in documenting tree species distribution, determining annual net costs/benefits, and establishing priorities for maintenance in the urban forest.

The UA Campus is an oasis in the middle of Tucson, with over 2000 UA trees lining the streets we service. These street trees contribute to the quality of life for all our neighbors, providing shade on pavements, and reducing air pollution, storm-water and the University's Carbon Footprint.

It is worthwhile to note that there are over 7000 individual trees on the UA campus, but that only the ones directly flanking public streets were counted in this study. Since many of the largest trees are situated in the interior of the campus, we can only guess at the greater benefit (possibly 3 times larger) that might result from an inventory of all the UA trees.



Contributions of the 2000 UA Street Trees:

Annual net CO ₂ pt sequestered/held	246,620 lbs CO ₂ per year
Annual reduction in energy costs for UA and neighborhoods	\$18,230 per year
Net annual reductions of emission and pollutants	395 lbs particulates per year
Total annual rainfall or storm water intercepted in gallons	1,096,871 gal per year

Assumptions of the STRATUM software program, part of the i-Tree Suite developed by the Center for Urban Forest Research at UC Davis include these:

Each species of tree has an average life span.

Each individual tree's current condition gives potential to reach that life span.

Each tree was measured for size.

Size relates to ability to take up water and provide other benefits.

Orientation on the streets influenced default shade benefit.

Aesthetic benefits relate to median home costs in a particular area.

Energy benefits depend on UA's cost per KWH of electricity and Therm of gas.



The olive trees on the west side of campus are some of the oldest trees in Tucson. Robert Forbes, planted the olives just after University establishment in the late 1800s. In his role as first head of the Agriculture Experiment Station, Forbes was particularly interested in trying tree crops from the Mediterranean lands.

The following passage is from the UA Historic Preservation Plan, adopted by the Arizona Board of Regents in 2006. The full document can be downloaded at http://www.cfp.arizona.edu/planning_studies/functional_plans

This specific text, on page 58 in the Maintenance Manual of the Historic Preservation Plan, was written in 2005 by Thomas Brown and Elizabeth Davison.

“It is known from old nursery catalogues that at least 46 varieties of olive were being offered in California nurseries between 1885 and 1895. The Santa Barbara nurseryman Kinton Stevens, in his 1891 and 1893 catalogues, offered the following varieties of olives: Cucco, Fantoiano (Frantoio, Frantojo), Manzanillo, Mission, Morchiaio, Morinello (Morailo), Nevadillo Blanco, Nostralis, Palazuolo, Picholine, Redding Picholine and Rubra (Caillon).

In his *Notes from Assembly Talk*, March 1, 1934, Robert Forbes says “On April 1, 1895, they planted a row of olive trees from Santa Barbara on the west side. Those in front of the girls’ dormitories (along North Campus Drive) I planted later.” It is highly likely the trees mentioned by Dr. Forbes came from Stevens and were some or all of the above varieties. They are Italian, Spanish and French in origin.”

In the 1940s, the former Stevens nursery site in Santa Barbara was bought by Madame Ganna Walska, who continued to enlarge and enhance the gardens (with the help of Stevens’ son Ralph) until she died in 1984 at age 97. At her death, the estate - including century-old olive trees - was made into a public garden, now called Ganna Walska Lotusland (web site <http://www.lotusland.org/welcome.htm>).

The UA Campus Arboretum was searching for information about the specific olive varieties, and we were fascinated with the idea that the Kinton Stevens offerings in 1890 were advertised as rooted cuttings from trees on his property. Put another way, we thought Lotusland might still have the parents to our olives. So we did some investigating.

After contacting staff at Lotusland in 2006, we arranged to have their olives tested for any genetic linkage with the UA olives. To accomplish this, the 35 olive trees running north-south along the University's Olive Walk were put through DNA analysis at the UC Davis Olive Center. (http://www.news.ucdavis.edu/search/news_detail.lasso?id=8472)

With support from a generous donor, Graduate student Jolie Goldenetz traveled to Santa Barbara in 2007 to gather Lotusland olive branches. She took them, along with the UA plant material, to UC Davis for analysis as to variety and relationship to each other. All the UA cuttings were rooted in the UC Davis greenhouses, and new shoot tissue was used for the analysis.

Results confirm that some olive varieties sold by Kinton Stevens in 1890 are here on campus. The 35 UA olives running north and south on Olive Walk, just inside the Main Gate, include the following varieties, all verified by the UC Davis database: Mission, Chemlali, Mavrelia, and Manzanillo.

However, the Lotusland samples don't match genetically with the 35 tested UA olives. What does this mean? Essentially it means that the olives that have survived until 2007 at Lotusland were not the parent stock from which the UA olives were originally cloned.

Furthermore, the UC Davis database of California current olive varieties does not contain all those originally sold by Kinton Stevens. This means that many varieties of olives originally sold by Stevens include some good survivors (Mission for example), but also some that never were suited to the California conditions (and thus, not in UC Davis's listing).

On the other hand, we can say which of the original Stevens varieties have survived in Tucson: Mission, Mavrelia (Morailo), and Manzanillo. We also know that a couple of the existing UA olive varieties are not available in California at this time. So - these were uniquely suited to Arizona, where they have graced the campus for over 100 years. And information about suitability is the goal of every variety trial - just what Robert Forbes was working on.





Campus Arboretum Support Grows

Do you appreciate the value of the University of Arizona campus as the oldest continually-maintained public green space in Arizona? Friends of the UA Campus Arboretum include former faculty, neighbors, Tucson newcomers, student groups, current UA faculty and staff and plant lovers from throughout the Southwest. Each year, enthusiasm and support increases.

Particularly during times of tight education funding – it is so important for our friends join with us in stewardship and support. As the University cuts back in response to the slowing Arizona economy, we need your help more than ever.

Please join us by giving to the Campus Arboretum in 2008. Your support is the only way in which we can continue our efforts. Giving levels range from named plazas and “pocket parks” to individual yearly memberships. Benches and adoption of Heritage Trees are other naming opportunities. You can donate to the newly-formed Operational Support Endowment Fund, or you can ask that your gift be used for current expenses.

Any level is a vote for our work! Use the form on the back of this newsletter and we thank you, in advance, for your generous support!

Collaborations

For the next two fiscal years, the UA Campus Arboretum is collaborating with the US National Arboretum in Washington, DC. Student Janka Vanova will collect herbarium specimens for the National Arboretum as she works to increase the UA's collection of campus specimens. The National Arboretum will provide wages and materials for the project. This agency will use the collected UA plants to respond to increasing requests for plant identification. The Campus Arboretum benefits from the association because the National Arboretum supports our ongoing vouchering of campus trees. And of course, the UA Herbarium, as a third partner, receives a sample of all pressed specimens as well as the student labor costs.

Corporate Members

Please join us in welcoming the newest Corporate Sponsors of the Campus Arboretum: Horticulture Unlimited of Tucson, AZ and Arid Zone Trees of Queen Creek, AZ.

Horticulture Unlimited is a nearly-30-year old landscape design/maintenance firm providing quality services to customers ranging from small residential sites to large commercial properties in Tucson and southern Arizona.

Arid Zone Trees is a well-regarded 26-year old wholesale grower of quality specimen-sized trees appropriate to the Desert Southwest.

Thank you very much for your support of the UA Campus Arboretum.

Student Projects

During the 2008 calendar year, we've had some excellent student projects:

1. Kara Di Nicola worked on seed collection, pruning and general horticulture.
2. Janon Al-Failakawi organized the Herbarium specimen cabinet and logged data.
3. Hui Chen cleaned up the Collections Database, updated the GIS map, and organized all the species photos for the web site.
4. Ben Brandt finished the Street Tree Inventory (thanks to a generous donor for his wages during this project!) Ben also planted trees, edited the GIS maps, and improved the Campus Arboretum web page.



Why Do Trees Get Removed?



One of the goals of the UA Campus Arboretum is to track and evaluate the reasons why trees on the campus might have to be removed. Recording the reasons allows us to identify issues with tree care, longevity of certain species, or other problems.

Since 2003, we have kept track of the trees that were taken down. To utilize a searchable database system, we chose six possible reasons for removal: Liability, Storm, Trauma, Decline, Construction and Unknown.

'Liability' is recorded if the tree is a risk (with unsafe structure and a vulnerable target). 'Storm' removal is common with not-quite-established trees in summer, or possibly old unstable trees. 'Trauma'

might happen due to a car accident, student carelessness, or, in one case, when a tree limb hit a second tree. 'Decline' covers a wide variety of issues, from overgrowing a small space (bad planning), to change in microclimate due to a new building, to disease or insect damage. 'Construction' is listed for all trees removed before a project begins and also any that decline afterward due to construction impact.

Each tree has an individual Accession number. When that individual is removed, we note that it was De-Accessioned, and we give one of the six reasons. If we really don't know why a tree dies, we use Unknown.

Since June 2004 (four calendar years) our Reasons for Removal are these: Liability - 1%. Storm -10%. Trauma - .5%. Decline -39 %. Construction - 50%. Unknown – 1.5%.

Donations – Thanks!



The following individuals donated plants to the UA Campus Arboretum during the first part of 2008:

Steve Harvath, Mick Reed, Ursula Schuch, Bill Thornton (twice), Patsy Waterfall, and the Desert Legume Program. Thank you one and all!

New Web Page



We are excited about the new web page! It's much cleaner, less clunky, shows more photos, and has more information. Please let us know what you think! <http://arboretum.arizona.edu>



Heritage Tree - *Ceiba acuminata*



Photo by M. Chamberland

Remember Mae Wests? Not Mae West the great comedienne, but “Mae West” as the nickname for life preservers? Before polyester, life jackets were made of kapok - a natural fiber packed into the fruits of the kapok tree. Kapok also was used to make the cores of softballs, badminton birdies, and pillows.

The family of trees that supplied commercial kapok is the Bombacaceae, which includes Baobab, Chorisia, and *Ceiba*. Over 200 species exist worldwide. The most well known is probably *Ceiba pentrandia*, a 150-ft-plus rainforest tree (made famous in a children’s book *The Great Kapok Tree*).

The Tropical Deciduous Forests of Mexico contain two genera, and one of those species - *Ceiba acuminata* - has developed successfully on the University of Arizona campus.

A medium sized tree with thick gray bark, the UA’s kapok tree stands about 30 feet tall. Horizontal branches define its leafless framework all winter and early spring. The bark is studded with conical “thorns” which, with age, grow to be pyramidal lumps up to an inch in height. In this bark armature, it is similar to *Chorisia* species.

Leaves are palmately compound, with approximately 7 leaflets which can reach to 4 inches long. Typically they emerge with flowers in late May, but drop as soon as the rainy season ends.

The solitary 3-inch flowers are exquisite - with five white to pale pink petals, somewhat fuzzy inside, and covered with golden hairs on the outside. What look like 5 stamens emerge from a central column (actually, each “stamen” is a bundle of several stamens). Because they are bat-pollinated, they open on warm May and June evenings, collapsing with the light of day.

Apparently the required bat species is not present on the UA campus, since fruit has not formed on the UA’s tree. In typical habitat, football-shaped capsules, up to 9 inches in length, hang on the branches long after leaves have fallen. During the dry winter season they dehisce, popping open with an audible noise and scattering seeds covered with white kapok to the wind.

According to Richard Felger (*Trees of Sonora*, Oxford University Press, 2001), *Ceiba acuminata*

(called 'pochote' locally) is found on slopes, valleys and plains, canyons and arroyos in the dry forests of Sonora, Chihuahua, and Baja California Sur. In mid to northern Sonora, they are restricted to the southern slopes of hills, but are vulnerable to frosts in unprotected locations.

Warren Jones is responsible for having gathered the seeds for this particular kapok tree - he remembers collecting them on a trip through southern Sonora. The seeds were germinated at the Campus Ag Center greenhouses, and the tree was installed in the late 1970s. On a campus with many nooks and crannies, it was easy to choose a southwestern exposure and protected (and possibly more humid) microclimate.

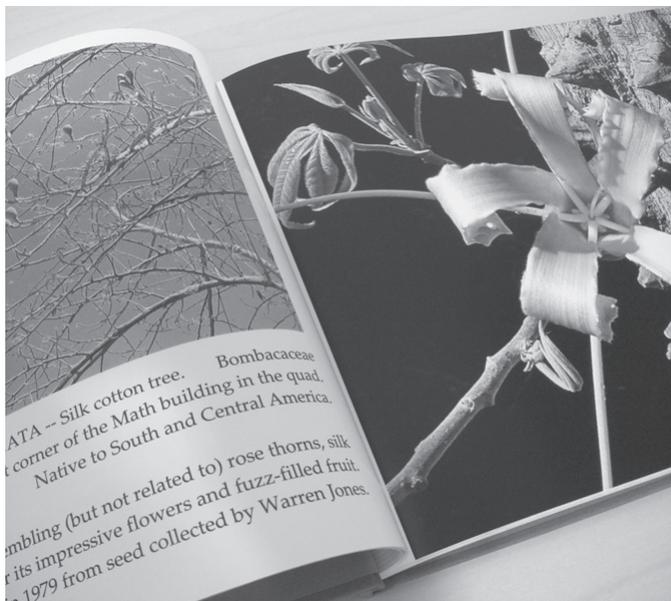
From the point of view of landscape design, *Ceiba acuminata* is a tree for a special place: protected and sunny. It would be a show stopper in a patio. Friends could gather for evening flower openings! During winter, its bare branches would allow sun onto the site.

Many trees in the Bombacaceae are useful to human cultures. The following information comes from

Richard Felger's research: The Guarijío, Mayo, and Yaqui harvested the tender, tuberous roots from young saplings or trees, generally as an emergency food; roots of larger trees are also edible but more fibrous and less desirable. The tuberous roots are peeled and eaten fresh or roasted. As emergency liquid, one would just suck on the root. The Yaqui relied on this plant for food and liquid during the Yaqui — Mexican wars. The seeds are oily and edible, with a butter-like endosperm and a nut-like flavor; they are usually roasted and ground. The seeds have been used by the Yaqui for allergies. The fluffy kapok serves as stuffing for pillows. The wood is sometimes used for tomato crates and pallets, cots, and occasionally as house beams if protected from the rain. (Trees of Sonora, p. 86)

The UA's *Ceiba acuminata* has been designated as one of the Campus Arboretum's Heritage Trees. You can find out more about all the trees on the UA campus by investigating the online searchable map/inventory at the web site: <http://arboretum.arizona.edu>

New Book of UA Heritage Trees



With assistance from the staff and student of the University of Arizona, we have created a special linen-covered book showcasing the Campus Arboretum's Heritage Trees. We are proud to offer it as a donation premium.

This 45-page book contains over 150 full color photos of the unique and stately trees on the University of Arizona campus. Each tree's history is part of the UA's history – and each tree is a treasure! The album is a treasure too, for you, for a current student or for a favorite alum.

We're happy to offer this personally dedicated book to all our friends who support the UA Campus Arboretum at the \$1000 level. Your donation can be used either for the Arboretum Operational Endowment Fund (ensuring financial stability for the future) or for current expenses. If you are interested in a special inscription for your book, please fill out the form on the last page of this newsletter.

THE UA CAMPUS ARBORETUM DEPENDS ON YOUR FINANCIAL SUPPORT.

Please detach this form and mail your donation to -

Campus Arboretum; PO Box 210036; University of Arizona; Tucson, AZ 85721

Make checks payable to UA Foundation / Campus Arboretum.

Your donation is tax deductible (less fair value for any goods received) to the fullest extent allowed by law.

- | | |
|---|--|
| <input type="checkbox"/> \$500/year Corporation or Business | <input type="checkbox"/> New Member |
| <input type="checkbox"/> \$250/year Garden Club or Non-Profit Group | <input type="checkbox"/> Renewing Member |
| <input type="checkbox"/> \$100/year Family | |
| <input type="checkbox"/> \$50/year Couple | |
| <input type="checkbox"/> \$25/year Individual | |

Please inscribe my personalized UA Heritage Trees book to _____ (Please print clearly)

This gift is for the Operational Support Endowment Fund

This gift is unrestricted, and can be used right away.

Name: _____

Home Address: _____

City/State/Zip: _____

Home Phone: _____ Work Phone: _____

OR Business/Firm: _____

Business Address: _____

We also have special naming opportunities that include gardens, groves, benches and other landscaped areas on campus. You can sponsor a shady site while you honor a loved one.

- Please call me - I want to discuss donating a bench (\$3000)

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