

ARIDUS

The Bulletin of The Desert Legume Program of The Boyce Thompson Southwestern Arboretum and The University of Arizona

Volume 20, Number 3

November 2008

Unique Legumes on the University of Arizona Campus, Part IV

Elizabeth Davison

Director, UA Campus Arboretum
Department of Plant Sciences
University of Arizona

During the 1960s, 70s and 80s, the University of Arizona in Tucson became the “proving ground” for dozens of arid tolerant species. In an effort to evaluate them for use in urban landscapes, the late Warren Jones, Professor Emeritus of Landscape Architecture installed trees and shrubs from around the world onto the UA Campus. The results of his lifelong dedication are the basis of the book “Landscape Plants for Dry Regions” which he co-authored with Charles Sacamano (Fisher Books, 2000.) Just as importantly, the UA Campus is now the home of hundreds of species of trees and shrubs, from arid climates on all continents. The University of Arizona Campus Arboretum has been established for the purposes of preservation, education, and enhancing this extensive collection. Our new offices are in historic Herring Hall on the UA campus. Please visit our web site at <http://arboretum.arizona.edu>

Acacia papyrocarpa

Western Myall

Hot deserts produce resilient trees. Australia has some hot deserts – in fact, about 44% of Australia is dry. Climate in the interior of that continent is similar to the low deserts of the American Southwest. Temperatures can range from freezing to over 100 degrees F. Combine that with little rain, dry air, bright light, and we call that a tough environment.

The west/central part of the continent – the territories of Western Australia and central Australia comprise

the Great Victoria Desert. With rainfall averages of under 9 inches, and in some places half that, this dry land is home to some of the toughest plants on earth. These species (many of them legumes) are winners in the ever-increasing heat of the American Southwest.

Acacia papyrocarpa hails from this region. Known as Western Myall, it has all the outward characteristics of a tough tree: stick-like gray foliage, spreading canopy, and extremely hard seeds. Western Myall is a multi-stemmed shrub/small tree that can grow to over 20 feet tall, with spreading flexible branches that are often pendulous. From afar it looks like a blue cloud. The bark is rough and fissured, and the flattened branches hang low.

Phyllodes (modified leaves) resemble needles, from 1.5 - 4.5 inches long. They are flat, and end in softly curved innocuous tips – no need to be wary of their appearance. The phyllodes are spaced ½ inch apart, giving each branch a “loose” appearance – no doubt functioning to disperse heat load. The shade, therefore, is light and dappled.

Flowers are small yellow puffs, 2 to 5 clustered together in the leaf axils. Their bright yellow is a perfect foil for the dusty blue of the foliage. Flowering time is early spring in Tucson, February into March. Fruits are legumes, 3-4 inches long, papery, with a width of about 1/4 inch. They are flat, and are slightly raised and constricted between the seeds. The seeds are small, black, and slippery – and very hard.

According to worldwidewattle.com, a most useful website for Australian acacias, Western Myall is

adaptable to a range of soils from sandy loam to clay, in high pH sites, in open woodland or shrubland. Uses for most of the Australian acacias can be found on this site, too. While seeds of many acacias are known to be edible, other potential uses for this genus include revegetation, for medicine, and for timber. The wood of *Acacia papyrocarpa* was used by the Aborigines, and may still be, for musical instruments and tools.

An interesting question is what prevents Western Myall seedling establishment in its native range. Seeds fail to germinate in most years. Researchers have noted that various species of ants normally carry seeds off and destroy them. (This seems to have happened on the UA campus). A combination of events must occur for seedlings to establish: high late-summer rains, combined with sheeting water flows which scarify the seeds – and presumably flush out ants, shallow burying of seeds, follow up rains that encourage seedlings, and low herbivore populations. Sounds right. In Western Australia, these events only occur together, on average, every 20 years. Growers should try to mimic these conditions, of course.

The UA's *Acacia papyrocarpa* was planted on campus during the Warren Jones era of “interesting tree experiments” in the 1980s. In the 20 years or more on the site, it has stretched, flopped, draped and spread to

about 16 feet wide. On the west side of Yavapai Hall, it gets full afternoon sun and reflected heat until about 4 pm in summer. This site has been a good one; the tree has rarely suffered through a killer summer, and more importantly, seems to be hardy down to the mid teens.

In landscaping, Western Myall is a blue cloud that would certainly catch one's eye. It is only moderately messy, since the leaves/phyllodes hang on for many seasons. This is one of those plants that probably would never look better with pruning. It could be used as a focal point, but would need room to spread. But more importantly, this thornless tree is tough as nails, and withstands all of our increasingly hot summers with nary a whimper.



Acacia papyrocarpa KC

Acacia victoriae

Elegant wattle, bramble wattle

Winter freezes in Tucson can drop temperatures into the teens for several hours. In January 2007, dozens of trees on the UA Campus were chilled or frozen to varying degrees, particularly non-native species. In evaluating the damage, we find that it is just as interesting to note what trees were not damaged. This way (in the ongoing spirit of Warren Jones's research) we can recommend them as very hardy useful species in the mid to upper elevations of the southwest.

One really tough one, seemingly, is *Acacia victoriae*, known as 'elegant wattle' or 'bramble wattle'. This plant is a sprawling shrub-like tree with interesting form and excellent flowering habit. Native to most of the Australian continent, *Acacia victoriae* grows in medium to heavy soils in alluvial plains, or in sandy soils where rain is more frequent. It can attain a

height of 5-6 meters, with an equal spread, particularly with multiple trunks.

Foliage, like that of many Acacias, is composed of dull blue-green phyllodes (not true leaves but rather expanded petioles). Each of these is slightly curved, to about 5 cm long, and has a prominent mid-vein and a waxy look. The shade could be characterized as medium dense, certainly deeper than many mesquites. Branches are covered in 1 cm stipular spines, 2 at the base of each phyllode, that are quite slender (not as bad as some other Acacias). Cream-colored ½ inch puffball flowers occur in pairs in the 10-12cm cluster. In Tucson, the bloom time is mid March. Flowering is heavy and the scent is strong. Apparently cross pollination is not required. Bees love the single UA tree – and the resulting fruit set is normally vigorous.



Acacia victoriae KC

The pods can grow to 8 cm long, and ½ cm across. They are papery and easily dehisce along the seams. Seeds are about lentil-sized.

Acacia seeds have many uses in Australia and elsewhere. Recent interest in “bush tucker” (traditional native cuisine) has sparked inquiry into the value of many native Australian species. *Acacia victoriae* seeds are valued for their nitrogen levels; they are sprouted, used in breads and ground up for meal. Similar to other indigenous cultures, Aborigines are helping to share traditional gathering and cooking techniques and to look for markets for ground and roasted seeds. Good information on this effort to use native plants and investigate “bush tucker” can be found on the web at <http://asgap.org.au/> and at <http://www.ffp.csiro.au/publicat/articles/seedsav.htm>

The leaves and stems are also moderately nutritious and thus useful for cattle/stock browse. Because of its rambling form, *Acacia victoriae* is grown as a hedge or windbreak or to prevent erosion.

This tree is another of Warren Jones’s legacy trees, brought to campus as an experiment in the mid 70s or early 80s. Seeds were germinated at the UA Campus Agriculture Center on Campbell Avenue (another cold spot in Tucson). Germination is enhanced by methods typical for many legume seeds: bring water to a rolling boil, remove from stove, soak seeds as water cools overnight to soften the seed coats.

The sprawly UA tree is situated in full sun, in a not-particularly ideal spot. Although it is on irrigation, the site has reflected heat, compacted soil, and doesn’t allow for good expansion. Nonetheless, the “elegant wattle” is performing elegantly.

This is a tree that deserves wider use, for open areas, for screening, or for a statuesque form combined with gray foliage and heavy flowering. It is a ramble-y tree, but beautiful and is being grown at some local nurseries. The Desert Legume Program in Tucson does have some seeds. Although it is not a tall tree, it does grow to fill a wide space. And more importantly, it is frost hardy to the low teens.

Enterolobium cyclocarpum

Ear pod tree, monkey’s earring, guanacaste

Guanacaste is a familiar tree to those who’ve visited, Nayarit, Jalisco, Colima, and other drier tropical states of Mexico. Its wide spreading silhouette dominates the skylines in fields and grasslands. During the hot rainy season, cattle, birds, and humans value the deep shade of the wide crown.

A grouping of three of the stately trees shades a concrete plaza on the University of Arizona campus. Situated in a planter on the east patio of the Park Ave. Student Center, they nearly always have clusters of students grazing or relaxing underneath. Another younger individual is on the southern side of the Engineering building.

Normally, *Enterolobium cyclocarpum* is one of the largest trees in the tropical deciduous forest of Mexico and Central America, reaching up to 3 m in diameter and 40 m in height, with a much wider spreading canopy.* Because of neighboring buildings, the UA trees are not wide, but they are almost as large as neighboring Aleppo Pines.

Guanacaste is well known for its unique seed pod, shaped like an ear. This pod turns glossy black and contains up to 16 seeds. Although the trees on the UA campus do not make pods (no pollinators? not old enough? insufficient gene pool?), a mature tree in a stand can produce an average of 2000 pods per year. The pods take 12 months to mature, fall at the end of the dry season, and are typically eaten by large ruminants. It is thought that the original consumers of *Enterolobium* pods are now extinct, so that today the dispersal of seeds is left to cattle and horses.

Up close, *E. cyclocarpum* is a typical bi-pinnate lacy-leaved legume (subfamily Mimosoideae), with alternate leaflets. Full leaves are 15 - 25 cm long. Depending on the time of year, the leaves can have a soft “ferny look”, similar to jacaranda or lysiloma.

Guanacaste’s range includes drier areas of the tropics, from 23° N in central Mexico to 7° N in northern S. America. Normally, the trees are deciduous during the 1 to 7 month dry season in those zones. Half a year with no leaves! Prior to the start of the rainy season, leaves flush out and small cream colored flowers form.

The UA trees are surrounded by concrete, (with a warm microclimate). Perhaps due to this protection, or due to irrigation, they are partially evergreen. Since the species has a limited tolerance of frost, their proper use in wide open sites might be restricted to warm cities like Phoenix or Yuma.

E. cyclocarpum is tolerant of soils with a wide range of pH, but adequate drainage is important. I have seen them in mucky fields near Puerto Vallarta, but there was a high percentage of decomposing coral and sand in the soils in most of those sites.

Human uses of guanacaste include shading, for both livestock and for gardens/urban parks; edible pods (both green and mature) as a high N food source; lumber for houses and boats; and soap from pods and bark, and medicinal use of bark extracts.

Warren Jones was responsible for bringing the *Enterolobium cyclocarpum* trees to Tucson and the University. He recalled looking in the Alamos, Sonora area, as well as in the state of Nayarit, without finding any ripe pods. Frustrated, he inquired when visiting Orlando, Fla, and found that the plant is considered invasive in central and south Florida. He was able to bring pods back to the UA Campus Ag Center, and germinate seeds there.

Propagation of guanacaste is not difficult. Collected seed is similar to that of many desert legumes. Good germination rates are possible if the usual scarification processes are followed: soaking in boiling water that is allowed to cool overnight, 15 minute sulfuric acid soak, etc. Seeds are big, and some research has shown that they must be planted 'right side up' (with the micropyle down) because the roots don't always anchor downward.

It is unusual to have a tree of this size in the Sonoran Desert cities. The market might be relatively small, but you couldn't find a better park or 'town square' tree for our urban heat islands. With frost protection while young, this is a species that could provide shade for some of our harsh concrete open

spaces. Universities, civic plazas, and convention centers all are good possibilities.

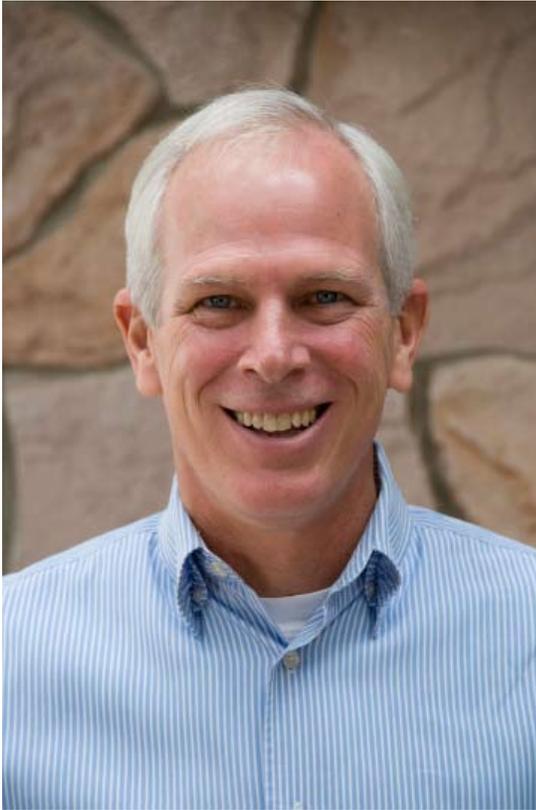
The University of Arizona Campus Arboretum has identified these trees as valuable contributors to the shade of our campus. They will be protected during the future expansion of the Park Student Center.

* Some of the information in this article can be found on the web site <http://www.winrock.org/forestry/>

Note – The write-up on these three species originally appeared in Southwest Trees and Turf published in Las Vegas, Nevada.



Enterolobium cyclocarpum KC



Boyce Thompson Arboretum names Mark Siegwarth Director

After an extensive national search, Mark Siegwarth has been named director of the Boyce Thompson Arboretum in Superior, Arizona. Siegwarth brings a proven record of leadership and vast experience with the Arboretum and Arizona State Parks Service to his new duties. A former United States Marine Corps officer, he graduated from Miami University, Oxford, Ohio, with a degree in economics and from the Kennedy School of Government at Harvard University with a master's degree in public policy.

Prior to being named Arboretum director, Siegwarth was responsible for a \$74 million budget at Arizona State Parks where he served as a member of the Senior Executive Team. No stranger to the Arboretum, Siegwarth has served on its board for the past five years, most recently as treasurer.

One aspect of Mark's new position is to serve as director of DELEP. He states that it is exciting to take over the leadership of a successful program and says the more he learns about DELEP the more impressed he is with the program's achievements over the past twenty years.

DELEP Personnel

Mark Siegwarth
Director

Matthew B. Johnson
Botanical Specialist

Ken Coppola
Horticulturist

Margaret Norem, Ph.D.
Editor Aridus

Kirsten Lake
Floristics Coordinator

Bruce Klewer
Administrative Assistant

Volunteer Coordinators

Yuma Fields
Glenn Branham
Pamela Honaker
Jamie Wahl

Advisory Board

Michael Chamberland
Elizabeth Davison
David Ellis, Ph.D.
Stephanie Greene, Ph.D.
Leslie Gunatilaka, Ph.D.
Ryan Huxtable, Ph.D.
Michelle McMahon, Ph.D.
Ken Morrow
Pamela Slate
Raymond Turner, Ph. D.

Staff and Volunteers in Action

Our December volunteer session will be Wednesday, December 10th, our annual holiday party. Spring 2009 session dates are January 14th, February 11th, March 11th, April 8th, May 13th. As a matter of interest, we will end our 20th year of volunteer sessions with number 200, in May of 2009.

At the October session I barbequed hamburgers and soy burgers for the group, as a fun break from our standard lunch menu. Please contact me by phone (520-647-2460) or email to kcoppola@ag.arizona.edu, to learn more about volunteer opportunities with the Desert Legume Program.

Mark Siegwarth began work as the Desert Legume Program's new Director on Monday, September 29th. Please join us in welcoming Mark! Our Advisory Board met just a few days later, on October 3rd. Advisory board chairwoman Libby Davison led the meeting, which included four other advisory board members: Ms. Pamela Slate, Dr. Shelly McMahan, Dr. Leslie Gunatilaka, and Dr. Dave Ellis. The meeting provided an opportunity for the board to meet Mr.

Siegwarth. We thank the board members for their continued interest in and participation with DELEP.

Warmer-than-average temperatures here have allowed us to continue seed collections in our fields, and around the state. Bill Kendall joined Matt for a few collection excursions, and I have stayed busy with collecting in our field plots. We are near the goal of 10,000 seeds for many species in our collection.

During October, Margie Norem and I planted a field with eight Lupin species with the specific goal of seed increase. Lupin seed increase has been marred by freezing temperatures while the seedlings were young and highly vulnerable. We remain optimistic and hope for a successful field, this year.

I planted "replacement" seedlings at our West Campus field, one *Acacia trineura* and two *Acacia hereroensis*, in October and November. I am in the fourth year of collecting phenology data, in all of our Tucson fields. **KC**



Opportunities for Participation

DELEP's bulletin *Aridus*, is published three times annually to stimulate interest in desert legumes, inform our readers of DELEP's activities, and encourage support of DELEP's programs. Manuscripts related to legumes are welcome and should be mailed to the editor for review. Subscriptions are complimentary and are available by contacting the DELEP office. *Aridus* is published by The University of Arizona for The Desert Legume Program.

Financial support for DELEP is provided by private industries, government agencies and individuals through contracts, grants and contributions. Dedicated volunteer work is an integral component of DELEP. Our volunteers have many different backgrounds and work on various projects including wild seed collecting, seed processing, special events and office tasks. Delep volunteers meet once a month.

To Volunteer:

Call (520) 647-2460

Email: kcoppola@ag.arizona.edu

To Contribute:

Call to discuss a pledge, restricted gift or estate planning

Make a check payable to
DELEP/U of A Foundation

Mail to Desert Legume Program
2120 E. Allen Road
Tucson, AZ 85719



Ken Coppola cooks for the volunteers at the October volunteer session. (MBJ)

The University of Arizona
Desert Legume Program
2120 E. Allen Road
Tucson, Arizona 85719
U.S.A.

Return Services Requested

NON-PROFIT
ORGANIZATION
U.S. POSTAGE PAID
PERMIT NO. 190
TUCSON, ARIZONA