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Legumes of Wallace Desert Gardens

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The virtues of desert legumes captured the attention of H.B. and Jocelyn M. Wallace when they first learned of the Desert Legume Program (DELEP) in 1989, about a year after the program was founded at the University of Arizona. They understood the importance of legumes' potential applications worldwide as well as the position of DELEP as a committed champion. The resulting alliance between Wallace Desert Gardens (WDG) and DELEP has been, in all aspects, mutually beneficial. The Desert Legume Program has received financial support from Wallace Research Foundation and Mr. and Mrs. Wallace personally. Wallace Desert Gardens became a trial/evaluation garden for interesting and unusual species of accessioned legumes that are today one of its most valuable collections. Mark Bierner, Director of Boyce Thompson Arboretum, DELEP's parent organization, says the WDG legume collection "is certainly significant for botanical reasons. Just as importantly, it exemplifies the long-

standing relationship between our organizations, one I see growing ever stronger year after year."

Wallace Desert Gardens is a non-profit foundation [(502(c)(3) under IRS rules] that was created in 1993, well after much of the garden was established. Its mission was written by HB, as he was fondly known, to reflect the original intent of the foundation:

Wallace Desert Gardens is a collection of the world's deserts plants located at an elevation of some 2400 feet. Founded by H.B. and Jocelyn M. Wallace in the mid 1980's, the gardens are home to some twenty-five hundred species of which nearly half are cacti. Some occupy the Cactus Pavilion, a 6000-square-foot structure designed by H.B. Wallace, primarily to protect tender species from desert temperatures that drop into the low twenties. Wallace Desert Gardens serves its original purpose of conserving and protecting plants indigenous to deserts of the Americas. WDG also collects and manages plants from other deserts of the world. It exemplifies biodiversity in cultivation and has an interest in rare and endangered desert flora. As a supporter of scientific botanic research, Wallace

Desert Gardens reviews and approves appropriate on-site projects of mutual benefit.

In the mid-1980's, the Wallace's moved, complete with their plant collection, from a Paradise Valley acre to a Scottsdale subdivision where they purchased numerous acre-plus lots. At the time, HB had "no idea it would be bigger than a two-acre garden." Although he "knew nothing of desert plants when he moved to Arizona" in the early 1980's, they quickly became his passion. Today the garden encompasses about eleven acres, having more than 16,000 plants



H.B. Wallace

representing over 450 genera and 2500 species. It is one of the most extensive and extraordinary private collections found anywhere. Although HB passed away in August, 2005, he left an enduring botanical legacy for the use and enjoyment of researchers, enthusiasts and students alike.

The Living Collection of Plants (Pg. 7) provides an overview of how the garden is defined. Plants that accompanied the Wallace's when they first moved to the property have now reached specimen size, are wondrous to all visitors and contribute significantly to the collections. The boojum "forest" is a unique mass planting of ten plants grown from seed collected under permit in the late 1970's. The plants arrived bare root at WDG in the early 1990's and today range in size from about seven to twelve feet. All are thriving in soil, climatic and horticultural conditions that are obviously ideal for their needs. In 2004, WDG acquired its Ephedra Collection from Stefanie Ickert-Bond, Ph.D., who collected and studied the material in preparation for her dissertation at Arizona State University. Unsurpassed in the world, it is the largest and most complete representation of New World *Ephedra*.

The Yucca Collection has 200 plants representing thirty accepted species. Twenty years of growth have produced *Yucca filifera*, *Y. faxoniana*, *Y. decipiens*, *Y. valida*, etc., in sizes upwards of ten feet, producing an extraordinary floral display for many spring months. Likewise, the *Echinopsis* collections attract neighbors, visitors and professional photographers alike to witness and capture the ephemeral, aromatic profusion of color. And no less popular are the Jocelyn M. Wallace Rose Gardens, a collection of two hundred plants, mostly hybrid

teas and floribundas, in three locations.

In contrast to other botanic gardens, WDG has a relatively short history. However, within that history, its relationship with DELEP is longer and more involved than with any other botanic organization. The first DELEP seedlings were delivered to WDG in 1990, including *Acacia berlandieri*, *A. constricta*, *A. eburnea*, *A. millefolia*, *A. notabilis*, *A. rigidula*, *A. spectabilis*, *Geoffroea decorticans*, *Havardia mexicana*, *Havardia pallens*, *Lucaena retusa*, *Prosopis glandulosa* var. *glandulosa* and *Prosopis velutina*. Since then, legume seedlings have been propagated for WDG each year.

The Desert Legume Program supplied seed to several nurseries at about the same time. Seed of other legumes planted at WDG from 1990 to about 1995 can, in some cases, be traced through those nurseries back to DELEP, particularly the more unusual ones from Australia, South America and Africa. Included in this category would be *Acacia karroo*, *A. saligna*, *A. visco*, *Bolusanthus speciosus*, *Prosopis tamarugo*, *Senna purpusii*. As the mapping/database projects develop at WDG, efforts will be made to trace DELEP seed through any of these nursery records.

Not all horticulturally promising legume introductions originated with DELEP. For example, *Mimosa martin-delcampoii* was originally collected by Ron Gass, owner of Mountain States Wholesale Nursery (Litchfield Park, AZ) and Greg Starr, botanist and owner of Starr Nursery (Tucson, AZ) near Miquihuana, Tamaulipas, Mexico. WDG subsequently tested several plants that have performed so well, they captivate all who see them in

flower. Their relatively large leaves and flowers and repeat flowering in spring and fall in shades of pink, make them especially appealing for urban desert landscapes.

Of interest are the DELEP accession records themselves. For example, seed for the *Senna aphylla* was collected in October, 1991 in La Rioja Province, Argentina. *Peltophorum africanum* seed came from Zimbabwe in July, 1990, *Colutea istria* from Israel in July, 1989, *Acacia cyperophylla* from New South Wales, Australia in 1994 and so on. As habitats worldwide are destroyed, "Botanic gardens play a major role in testing new plants and serve as storehouses for plant diversity," says WDG Board Member and botanist Kent Newland.

The DELEP trial fields at the Yuma Mesa Agricultural Center, in Yuma and the three sites at the U of A Campus Agricultural Center facilities, in Tucson are sites where performance evaluations have been conducted in recent years. All vary widely in ecological factors—soils, temperature, elevation, annual rainfall, predation, horticultural factors, etc. Due to a protected site and horticultural practices of four full-time staff, legumes at WDG receive constant nurturing, making them ideal for evaluation as potential landscape introductions as well as for legume research. As Kent Newland explains, "All botanic gardens are dependent on collectors for clones of plants in habitat and exist from without rather than within; we are fortunate indeed to have the interest of Matt Johnson and the collections of the Desert Legume Program." Beginning this fall, the legumes in the Wallace collection will also be evaluated on performance using DELEP protocols, providing still another dimension of data to the program.



Acacia cyperophylla

Among the many legumes grown at the Wallace Desert Gardens, several species that are relatively new to Arizona horticulture have performed particularly well and are highlighted below. Several of these were introduced by DELEP. *Acacia cyperophylla*, mineritchie or red mulga, is an unarmed, multiple-stemmed shrub or small tree 10-15 ft. tall with an umbrella-shaped canopy. A unique and attractive characteristic is the smooth, reddish bark that peels into numerous thin, curling strips along the trunk and branches. The foliage consists of narrow evergreen phyllodes. Yellow flower heads appear from winter into early summer. This acacia appears to be hardy to at

least 20° F. It is native to arid regions of Australia.

Acacia galpinii, monkey thorn, is a large, upright tree with a potential mature height of 100 ft. though 50 ft. is more common. Twigs are armed with viciously sharp, paired, claw-like thorns. The pale gray to tan bark separates into strips. The foliage is gray-green and produces abundant shade. Flowering has yet to be reported on trees in Arizona. Trees are damaged at about 22° F but recover quickly the following season. Monkey thorn is native to southern Africa in parts of Botswana, Malawi, Mozambique, South Africa, Zambia, and Zimbabwe.

Acacia jennerae, coonavitra wattle, forms upright, unarmed shrubs or

trees to 18 ft. tall. The smooth reddish or orange bark contrasts with the foliage that consists of blue-green phyllodes resembling the leaves of some species of *Eucalyptus*. Yellow flowers in small heads are produced in winter and early spring. Coonavitra wattle appears to be reliably hardy to at least 15° F. It is native to areas of central and southern Australia. Under well-irrigated situations, this species can produce numerous root suckers.

Amorpha fruticosa, false indigo, grows as shrubs 6-12 ft. tall. The plants are unarmed, with smooth, tan to gray bark. Leaves are once-pinnate and are winter-deciduous. Attractive, small, dark purple-blue flowers are produced in racemes at the ends of the stems in spring. This species is very cold tolerant. False indigo is widespread in the southwest United States and northern Mexico.

Bolusanthus speciosus, tree wisteria, is a graceful, upright, unarmed tree growing 20-30 feet tall. The bark is cinnamon-brown, becoming deeply furrowed. The glossy green leaves are evergreen unless killed by frost. Beautiful and showy blue to mauve flowers are produced in long wisteria-like racemes in spring. Cultivated tree wisteria have survived overnight lows of 20° F without stem damage, though the foliage is killed at somewhat higher temperatures. This tree is native to areas of southeastern Africa.

Caesalpinia palmeri, palo piojo, is an unarmed shrub or small shrubby tree 10-20 ft. tall. The bark is pale gray with conspicuous white lenticels. Small, dark green leaves are deciduous with drought or cold. Yellow flowers with orange flecks on the upper petal are produced during the summer months. This species is hardy to 20° F. It is native to Sonora and Sinaloa, Mexico.



Acacia galpinii

Caesalpinia paraguariensis, guayacán, is a spectacular, unarmed, spreading tree growing 25-50 ft. tall. The bark is smooth and mottled with green, gray, tan, and beige, exfoliating in plates or strips, and resembles the bark of some species of eucalyptus. Newly emerging leaves are rust-colored, changing to dark green. The plants are deciduous with freezing temperatures. Small yellow flowers are scattered through the canopy during the summer. It is hardy to about 18° F. Guayacán is native to forest habitats in the Gran Chaco Region of northern Argentina, southern Bolivia, western Paraguay, and southwest Brazil.

Colutea istria, bladder senna, is an unarmed shrub 6-8 ft. tall with a

dense, upright growth habit. Plants grow during the cooler months and become dormant and partially deciduous in summer. Flowers are bright yellow and pea-like with orange coloration on the banner petal. Flowering is in February and March. This plant gets its common name from the inflated seed pods. Bladder senna is reliably hardy to 15° F. It is native to parts of Israel, Jordan, and Syria. *Mimosa ephedroides*, prendador, is a shrub that resembles species of *Ephedra*, Mormon tea, as the specific epithet suggests. This mimosa is unarmed and grows as an upright shrub to 6 ft. tall with green stems and small, deciduous leaves. White to pale pink flowers in rounded heads are produced in summer. It is hardy to

18° F. This species is native to parts of the Monte Desert of Argentina.

Mimosa martin-delcampoi, bauhinia-leaf mimosa, is an unarmed, upright shrub that grows 6-10 ft. tall. The bark is purplish, becoming gray on older stems. The leaves have rather large, leathery, kidney-shaped leaflets. Showy pink flower heads are produced in the summer. This plant is hardy to around 18° F. Native to southwestern Tamaulipas, Mexico, this species was introduced by Arizona nurserymen Greg Starr and Ron Gass.

Prosopidastrum globosum, caballo de diablo, is a spreading, spiny shrub growing 6-10 ft. tall with green, sharp-tipped twigs. The leaves are small and deciduous with cold or drought. White flowers are produced in rounded heads in summer and autumn. This species is very cold hardy – perhaps to below 0° F. It is native to parts of central Argentina.

Prosopis reptans var. *cinerascens*, dwarf screwbean, is a low subshrub to 1 or 2 feet tall, spreading by root-sprouts. The stems have paired, white spines. Small, blue-green leaves are cold deciduous. Bright yellow flower heads in summer are followed by coiled pods that turn bright yellow and remain on the plants for months. Dwarf screwbean is hardy to at least 15° F. The plants are native to southern Texas and eastern Mexico. The tendency to spread by root-sprouts can become a problem in well-irrigated situations.

Senna aphylla, leafless senna or pichanilla, forms unarmed spreading shrubs to 6 ft. tall and 8-10 ft. across. The bright green stems are leafless after the seedling stage. Older stems sometimes turn orange or brown. Showy masses of bright yellow flowers are periodically produced in

(Continued on page 5)



Staff and Volunteers in Action

DELEP's Tucson Fields: 18 Years of Volunteer Effort

DELEP's earliest field plantings, from 1989 through 1994, were made with the goal of learning many things about known and little-known desert legumes. Our realistic expectation was that some of these specimens and species would likely not survive. DELEP fields lie in an area of extreme cold air drainage, and are reported to be one of the coldest areas of the Tucson valley during winter months. As such, they are in a great location to evaluate species for frost-hardiness, or tenderness. Most specimens planted there survived, while some have struggled (and have been mostly unremarkable in performance). Others did not survive beyond their first or second winter. (See ARIDUS, Volume 16, number 3 [November 2004]). Still, the primary goal of those plantings was one of increasing our seed supplies for further research and exchange, while ultimately creating an aesthetically pleasing park-like atmosphere. Hundreds of woody plants and several lupin species are included. Some plants that did not survive here were re-planted successfully in our Yuma, Arizona fields.

Both, trees and shrubs were planted in three consecutive but separate "borders". Matt organized the field layout considering factors such as the separation of lesser-known species that might cross-pollinate or become weedy. Specimens were grown by volunteers during the year

before our first planting. We were quick to plant these when we acquired the space. Lupins have been grown in other areas of the borders and their seeds were mostly direct seeded into the field.

During the past seventeen years, we've assembled a great deal of horticultural information from those plantings as well as substantially increasing seed quantities.

Efficient application of irrigation water is a key to plant success in both landscape and research situations. It is also an important means for water conservation while simultaneously reducing weed problems. During June of this year, Adam Ryan and I completed the installation of a drip irrigation system in borders three and four. The challenge of burying irrigation tubing around the mature plant specimens was a happy challenge (even at 100°F), as we pondered the more positive effect that would be created for those plants. Nearly 400 drip emitters were carefully placed around the plants in those two borders. We did this in DELEP's oldest border two years ago. Plants there and at our West Campus field have grown well under drip irrigation, with the additional benefit of significantly reduced weed problems. Thanks to the UA Campus Agricultural Center staff for their work, installing the hard pipe and new valves.

Fall 2006 volunteer session dates are scheduled for September 13th, October 11th, November 8th, and December 13th. DELEP's Advisory Board will meet again on September 15th. Please call 520-318-

7047 or email me at kcoppola@ag.arizona.edu to learn more about DELEP's volunteer program.

(Continued from page 4)
response to moisture from spring through fall. Established plants have survived 15°F without damage. Leafless senna is native to central and northwest Argentina.

Senna purpusii, Baja California senna, is an unarmed shrub 3-4 ft. tall with gray bark. The drought deciduous leaves have bluish green leaflets, often with red-purple margins. Showy yellow flowers appear in winter and spring. This species is hardy to about 24°F. Native to the Pacific slope of the north central Baja California peninsula, Mexico.

Other legume introductions continue to be planted at the Wallace Desert Gardens for evaluation and many of these are showing promise as excellent landscape plants.

For further information on the Wallace Desert Gardens, please contact:

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**Wallace Desert Gardens
List of Accessions from the
Desert Legume Program**

Caesalpinioideae

Bauhinia lunarioides
Caesalpinia paraguayensis
Peltophorum africanum
Parkinsonia africana
Senna aphylla
Senna pleurocarpa var.
pleurocarpa

Mimosoideae

Acacia acuminata subsp. *burkittii*
Acacia adsurgens
Acacia angustissima var.
angustissima
Acacia aroma
Acacia brachystachya
Acacia cheelii
Acacia crassifolia
Acacia cyperophylla
Acacia furcatispina
Acacia galpinii
Acacia gerrardii subsp. *negevensis*
Acacia grandicornuta
Acacia haematoxylon
Acacia harveyi
Acacia jennerae
Acacia kempeana
Acacia microcarpa
Acacia millefolia
Acacia nebrownii
Acacia neovernicosa
Acacia occidentalis

Acacia oswaldii
Acacia pachyacra
Acacia patagiata
Acacia permixta
Acacia quadrimarginea
Acacia quornensis
Acacia rivalis
Acacia roemeriana
Acacia schottii
Acacia victoriae
Albizia sinaloensis
Mimosa ephedroides
Mimosa farinosa
Painteria elastichophylla
Prosopidastrum globosum
Prosopis nigra
Prosopis reptans var. *cinerascens*

Papilionoideae

Amorpha fruticosa
Bolusanthus speciosus
Brongniartia minutifolia
Colutea istria
Coursetia glandulosa
Eysenhardtia orthocarpa
Eysenhardtia texana
Psorothamnus spinosus
Retama raetam
Schotia afra var. *afra*
Schotia afra var. *angustifolia*
Tephrosia leiocarpa

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The Living Collection of Plants

PLANT TYPE	DESCRIPTION	EXAMPLE TAXA
Specimen Plants	Include the oldest, most mature plants in the collection from any source. They may be considered irreplaceable.	<i>Aloe ramosissima</i> , <i>Ferocactus pilosus</i> (clump), <i>Echinocactus platyacanthus</i> , <i>Euphorbia resinifera</i> , <i>Neobuxbaumia scoparia</i> , <i>Myrtillocactus cochal</i> , <i>Chorisia hybrid</i> , <i>Yucca</i> collection.
Plants with Data	Include all plants in the garden that are accessioned prior to placement at W D G . They are from the Desert Legume Program, other botanical gardens and/or are of known provenance. These plants may intrinsically have	<i>Ephedra</i> Collection, all plants from Desert Legume Program (DELEP), The Huntington Botanical Garden (HBG), Desert Botanical Garden (DBG) and plants whose seed or tissue is of known provenance; may include several nursery-grown species, e.g., <i>Agave</i>
Unusual Plants	Include plants not commonly found elsewhere in cultivation. The seed or plant may, but not necessarily, be from	<i>Opuntia stenopetala</i> , <i>Salvia similis</i> , <i>S. doorii</i> , <i>Polygala mitrifolia</i> , <i>Urginea maritima</i> , <i>Yucca endlichiana</i> , <i>Fouquieria columnaris</i> , <i>Uncarina</i> spp., <i>Cyphostemma juttae</i> , <i>Boophone</i>
Trial Selections	Include hybrids and selections whose value is in their horticultural, cultural and aesthetic characteristics. They may be viewed as experimental and/or trials for	<i>Dioon edule</i> subsp. <i>edule</i> , <i>Fouquieria diguetii</i> , <i>Sabal minor</i> , <i>Ipomoea longifolia</i> , <i>Tecoma garocha</i> , <i>Mimosa martin-delcampo</i> , <i>Schinopsis quebrachocolorado</i> , <i>Maireana sedifolia</i> , <i>Melanthus major</i> , DELEP Accessions
Native Plants	Include plants already on the property prior to formation of W D G .	<i>Larrea tridentata</i> , <i>Carnegiea gigantea</i> , <i>Canotia holacantha</i> , <i>Ephedra aspera</i> , <i>Yucca baccata</i> , <i>Ferocactus wislizeni</i> , <i>F. cylindraceus</i> , <i>Fouquieria splendens</i> , <i>Opuntia</i> spp, <i>Prosopis</i> spp., <i>Parkinsonia</i> spp, <i>Olneya tesota</i>
Rose Collection	Include Hybrid Tea, Floribunda, Grandiflora, Climbers and Ramblers, English and Miniature selections, all 150-200	'Peace', 'Class Act', 'Queen Elizabeth', 'White Dawn', 'Pride 'n Joy'
Landscape Plants	Include all other plants of nursery stock.	

Tree
Logo
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Opportunities for Participation

DELEP's bulletin *Aridus*, is published three times annually to stimulate interest in desert legumes, to inform our readers of DELEP's activities, and to encourage support for 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 on behalf of The Desert Legume Program.

Financial support for DELEP comes from contracts, grants and contributions from private industries, government agencies and individuals.

To Contribute: Send a check, payable to U of A Foundation/ DELEP, or call the DELEP Office concerning a pledge, a restricted gift, or estate planning.

The Desert Legume Program
2120 E. Allen Road
Tucson, Arizona 85719

Dedicated volunteer work is an integral component of DELEP. Our volunteers come from many backgrounds and work on a variety of projects including wild seed collecting, seed processing, organization of special events, and office work.

To Volunteer: Or just to explore the possibilities, telephone our office (520) 318-7047) or drop us a note or email: kcoppola@ag.arizona.edu.



Mimosa martin-delcompoi

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