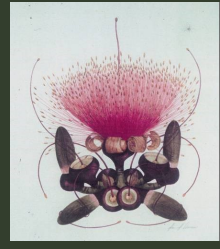


Gifford Arboretum Newsletter

Spring 2017

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Dr. William (Ned) Friedman, 2017 Gifford Arboretum Lecturer



It is our great honor and pleasure to welcome this year's John C. Gifford Arboretum Lecturer: Dr. William (Ned) Friedman. He is an evolutionary biologist who is the Arnold Professor of Organismic and Evolutionary Biology, and the Director of the Arnold Arboretum, at Harvard University. Dr. Friedman is also a fellow of the Linnean Society of London, and a 2004 recipient of the Jeanette Siron Pelton Award, granted by the Conservation and Research Foundation through the Botanical Society of America. In 1991, he received the Presidential Young Investigator Award from the National Science Foundation.

Dr. Friedman earned his Bachelor of Arts degree in Biology at Oberlin College in 1981, and his Doctor of Philosophy degree in Botany at the University of California, Berkeley in 1986. He spent his early career in the Botany Department of the University of Georgia before joining the faculty at the University of Colorado in 1995. There he was a professor of ecology and evolutionary biology, and his research focused on patterns of plant morphology, anatomy, and cell biology. He also led groundbreaking research in developmental biology and the early evolution of flowering plants, and he won acclaim for his discovery of a new type of reproductive structure that represented a critical link between flowering plants and their ancestors.. Specifically, his work has focused on reproductive biology of Angiosperms to understand their evolutionary

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origins and how that led to astonishingly rapid species diversification. Throughout this time, and on an ongoing basis, Dr. Friedman has also had a keen interest in the history of science and, in particular, the history and development of the theory of evolution. He has designed and taught courses on the work of Charles Darwin and other historical figures in the development of evolutionism, and has given many lectures on this topic.

As a reflection of Dr. Friedman's dedication and expertise as both a botanist and evolutionary biologist, he received a tenured professorship at Harvard University and was appointed the eighth director of the Arnold Arboretum commencing in 2011. Designed by Frederick Law Olmstead and founded in 1872, the 285-acre Arnold Arboretum contains over 15,000 curated plants representing more than 2,100 species. It is widely recognized as one of the premier arboretums in the world.

Now in his 7th year at Harvard, Dr. Friedman is highly involved in leading interdisciplinary research, teaching, and outreach. He is also an active member of the National Science Foundation sponsored program, microMORPH, which provides research training and networking opportunities for undergraduate and graduate students from all around the country. His current research focuses on the organismic interface between developmental, phylogenetic and evolutionary biology.

At the 29th Annual John C. Gifford Lecture taking place on **Monday, April 3rd 2017, at 7 PM in Cox Science Center Room 126**, Dr. Friedman's topic will be **"Mutants in our Midst: Darwin, Horticulture, and Evolution."** Although often overlooked as such, many of the horticultural varieties that we grow in gardens are premier examples of the ongoing process of evolution: random mutations that lead, on the rarest of occasions, to novel and desirable biological characteristics. Throughout his life, Charles Darwin (as well as other nineteenth century evolutionists) looked to the world of horticulture and plant domestication to gain critical insights into the generation of variation and the process of natural selection that underlie evolutionary change. Dr. Friedman will show how horticulture played a central role in laying the foundations for discovering evidence of evolution itself, as well as understanding how evolution works. He will argue that modern botanical gardens can and should become a leading force for the promotion of evolutionary thinking in society by highlighting the very kinds of mutations observed by Darwin, as well as new examples of monstrosities and mutants that continue to be found in botanical living collections around the world.



SPECIAL THANKS ARE EXTENDED TO **MONTGOMERY**
BOTANICAL CENTER FOR ITS ONGOING CO-SPONSORSHIP
OF THE ANNUAL GIFFORD LECTURE

Arboretum plants teach students about hidden microbial players through hands-on science

By Kasey Kiesewetter

This spring, students in Dr. Michelle Afkhami and Dr. Valentine St. Hilaire's Howard Hughes Medical Institute labs designed research projects looking at the effects of fungal endophytes living inside the leaves of Gifford Arboretum trees. Fungal endophytes are fungi that live in all plants and that can have important ecological, medical, and economic attributes. For example, endophytes can increase drought tolerance and reduce pest damage of plants through chemical defenses. They are also the source of important natural products such as Taxol, which is a commonly-used anti-cancer drug.

Students in the class are performing two experiments, one on biological properties of fungal endophytes and then another on chemical properties. To perform the experiments, students first spent time getting familiar with the Arboretum's collection and sampling tree leaves. Next, the students sterilized and cultured fungi from the leaves while observing how the fungal endophytes' growth changed under a variety of conditions.

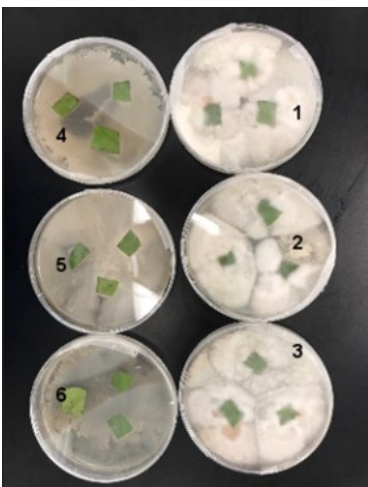


Students collecting plant tissue in the Arboretum.

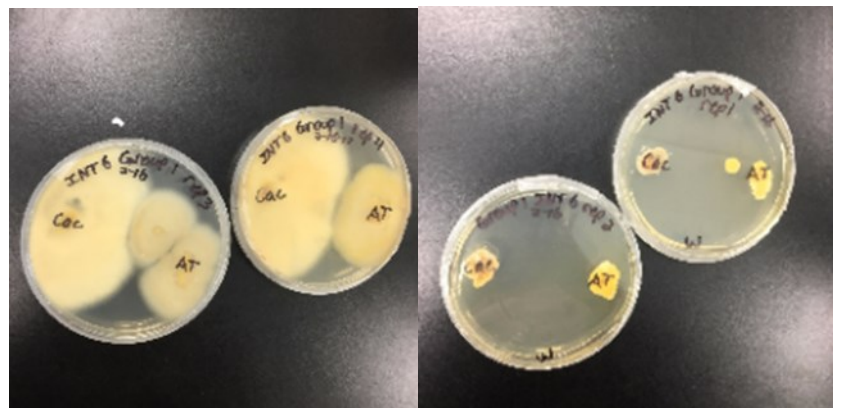


Sterilizing and culturing fungal endophytes from plant tissues

One popular topic that excited students was looking at the antibacterial properties of both medicinal and edible plants. Other groups explored the fungal endophyte differences in angiosperms compared to gymnosperms; in leaves from differing heights on trees; and from tropical plants in high versus low temperature conditions. Still other groups investigated coexistence between fungal endophytes of different species under temperature stress or in the presence of bacteria.



Fungal endophytes of miracle fruits grown either without bacteria (1-3) or with (4-6)



Fungal endophytes from a cactus (CAC) and angel's trumpet (AT) competing against each other. Plates on the left were at room temperature and plates on the right were in a hot room .

Since completing the biological portion of the class, the students have begun to use their cultures to explore differences in chemical properties of these fungal endophytes.

What Happened to Landscape Plant Diversity ?

By: Craig Morell, Director of The Kampong of the National Tropical Botanical Garden

One of the disturbing things I notice in so many local landscapes is the lack of plant diversity, versus the huge array of plant options available to those who design and install landscapes. I wonder why this 'banality' exists, when there is an archipelago of botanical institutions, forward-thinking nurseries, and public arboreta available. We live in one of the largest nursery areas in the country, where our myriad local nurseries are the primary source of tropical plants for most of the nurseries and garden centers in the continental USA. We can do far better in planting diverse and beautiful landscapes, but I wonder why so many landscapes have such a common thread of, well, common-ness.

Given that the green businesses in this county have access to thousands of plant species and selections, I wonder: why do we see the same basic palettes of plants in so many commercial and residential installations? There are likely several practical reasons why we see "common" plants so often, mostly arising from the cyclic-logic decisions of installing landscape plants. Inevitably, the customer has a budget for landscaping, and the budget primarily drives the selection of plants. Secondly, each landscaper has his/her favorite plants for a given site, which too often is a limited number of species. This combination of fixed budget and limited vision for plantings hinders the creative process. Over the last 30 years of living in South Florida, the most common statement I hear is "I want a landscape that doesn't cost much and requires little maintenance". I believe this is a creativity-killing statement unless the installer starts asking if he/she can do something a bit different which fits the budget/care framework. In any given group of plants that CAN grow in our area, there are dozens or hundreds of plants that can be used. Yet, we see the same plant selections used over and over.

There are secondary considerations of the labor and time costs for a landscaper to drive to remote areas to get less utilized plants. The possibility also exists that these plants may not be available in large numbers of a certain quality or size. Customers may be impatient and want an installation done quickly in order to close on a home sale or to open a new business. I believe the core issues may be deeper, speaking to a generalized lack of knowledge or interest in broadening their knowledge of options. There is a more subtle problem when considering commercial landscape installations where additional profit is attached to installation changes. Long term plant choices may be counter to a business model where landscape changes are a tactic to boost profitability.

So, with all these issues at hand, how can we drive greater diversity into our landscapes? There are several pivotal questions to be answered to resolve the problem.

1. Who can be the oracles of experience and speakers for new plants? The answer is hardly new, with the decades-old adage of "right plant, right place". For almost any landscape scenario, there are myriad choices, but how can landscapers and customers access the information known by a fairly small number of professionals who don't have profit as primary motive ?
2. How can we change the prevalent thinking of "need it now, grow it quickly, and get it done fast?"
3. What considerations should we consider when trying to promote plants for landscaping, without unduly favoring the few people who grow unusual or under-utilized species?

I believe the answers are similar to the core issues which face education in general. With the great gardens, arboreta and nurseries available, I believe the answers to the issues of banality are simple to define but hard to implement. The answer would start with being able to instill a sense of curiosity in those who install plants by answering their questions of budget, plant speed, plant availability, and give them the ability to educate the customer.

The amount of 'mental firepower' available from The Gifford Arboretum, several botanical gardens, the Master Gardener / IFAS Extension Service and several excellent nurseries is massive and readily available. The information is here, the supplies of plants are here, the intellectual property to coach the details of installation is here.....so why don't landscapers use the resources? I suspect that we might face some of the same roadblocks as many other educational programs that foster change. People are comfortable with the plants they've used before; they know the profit garnered for a given "recipe" of plants, the problems with installation, and the local nurseries with a stable supply of needed cheap plants. In their minds, if everything they do has worked well, why change anything? What is the real speedbump to change? Is it the customers' lack of interest in something different? The lack of interest in landscapers to educate their customers to something other than the usual 'cheap-and-local' plants is painful. We need better tools for dispersing practical information, and hope that the green businesses will listen.

In the meantime, The Kampong, The Gifford Arboretum, Fairchild Tropical Botanical Garden and other institutions can display a wide diversity of plants for our climate. Those who carefully tend to these collections hope that customer demand for the new and unusual will escalate. It will be customer (or landscaper) demand which will drive nursery owners to grow the more unusual plants. With educated consumers asking for green businesses to source and install greater plant diversity in commercial and residential landscapes, our great city will have more plant diversity than ever before. Let us foster the inquisitive mind, promote the unusual species, and keep introducing new plants into the area.

A few of the plants growing in the Gifford Arboretum that should be seen more commonly in our landscapes:



Amyris elemifera



Brownea macrophylla



Licuala peltata var.
sumawongii



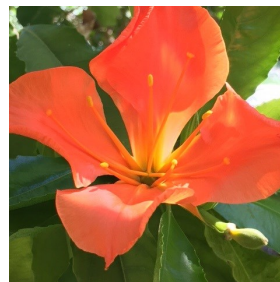
Butea monosperma



Brya ebenus



Licaria triandra



Erblichia odorata



Exothea paniculata



2017 Plant of the Year
Byrsonima lucida "Locustberry" (Malpighiaceae)

Available for distribution Spring 2017



Figure 1: *B. lucida* flowers
Photo credit: George D. Gann

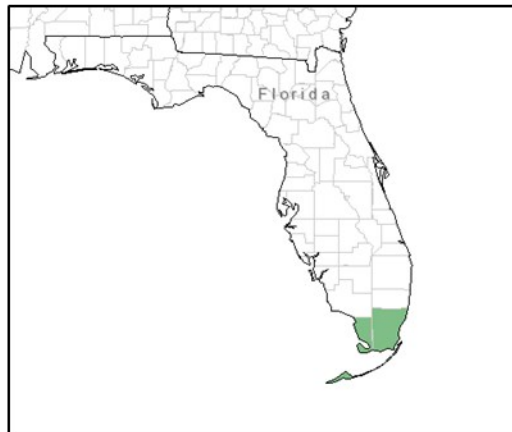


Figure 2: Round growth habit of *B. lucida*, by: Eric Fleites



Figure 3: *B. lucida* flowers, by Roger Hammer

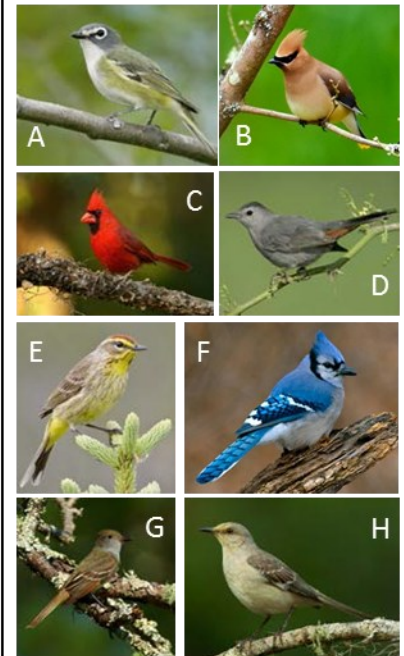
Description



Locustberry is a dense, rounded shrub or small tree that is attractive and will enhance any yard. It has leathery, rounded leaves; pale brown bark; and delicate clusters of pink to orange or red flowers (Figures 1 and 3). List as threatened by the state of Florida, adding this underutilized native to your yard or patio will help the many songbirds that eat its fruit and the butterflies that relish its nectar. Very importantly it is the larval host, as well as a nectar plant, for Florida duskywing (*Ephriades brunnea*) butterflies.

Native to pine rocklands and rockland hammocks, it does best in full sun or light shade. It is drought tolerant and has a moderate rate of growth. It prefers moist, limestone soils, so a layer of mulch around your plant is recommended. It makes a great accent shrub or can be used effectively in a buffer planting. It has low nutritional needs.

Some fauna that use *B. lucida*



Birds:

- A. Blue Headed Vireo (B. Small)
- B. Cedar Waxwing (cdbtx)
- C. Northern Cardinal (J. Rogers)
- D. Gray Catbird (B. Small)
- E. Palm Warbler (G. Bartley)
- F. Blue Jay (G. Mueller)
- G. Great Crested Flycatcher (J. Rogers)
- H. Northern Mockingbird (J. Rogers)



- I. Florida Native Bees
- J. European Honeybees
- K. Ceraunus Blue
- L. Florida Duskywing

Director's Message— Since the recent announcement that our Arboretum is finally free of the threat of a road running through it, I am glad to announce that things have been progressing nicely on planning the expansion area of the Arboretum. First, I am very pleased to announce that approval has now been obtained for construction of a new, state-of-the art greenhouse in this area. I firmly believe that if our University is going to continue to attract top botanists, such a facility is vital and required. I am also happy to report that progress is being made to turn part of the new area into a pine rockland habitat. With the help of South Miami Vice Mayor Bob Welch, 7 pines have already been planted and others pines as well as saw palmetto plants have been acquired for planting in the Spring. I am also trying to create an aquatic garden and a space for a Sustainability Garden for use by undergraduates in the new area. Progress is also being made to remove exotics and restore the Taylor Alexander Biodome as a pristine South Florida native hammock.

Thanks again to Charles J. Kropke, Dr. Patrick Griffith and Chris Rollins for some great programs, and to Frost Woodwind Quintet and Big City Folk Band for some delightful music, since our last newsletter. We are looking forward to hearing Jason Lopez on May 3rd!

Thank you to our Supporters!

I am very pleased to acknowledge and publicly thank the following recent donors. These gifts are especially appreciated since we were unable to mail any solicitations last year. If I have inadvertently missed anyone, please accept my sincere apology. Thanks again to all!

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Recent contributions of time and/or materials are also recognized and much appreciated:

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To learn more about planned giving opportunities that can benefit you and the Arboretum, contact Kyle Paige, JD '89, director of estate planning and giving, at kpaige@miami.edu or 305-284-1527.

Please make a gift to the Gifford and/or include Gifford Arboretum in your estate plans to help support the ongoing work of caring for the trees and to enable the Arboretum to remain a central feature of the UM campus for generations to come.

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