# Gifford Arboretum Newsletter Fall 2018

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# The Gifford Arboretum: Today and in the Future

By: Steve Pearson, Arboretum Director

This newsletter marks my completion of 7 years as Arboretum Director. I love the Arboretum, and trying to make it better has been fun and meaningful. However, recent health problems have limited my ability to work with the plants as much as they need. My health is slowly improving and, after a short rest, I am looking forward to a new chapter in my life. But my days of hard, physical labor needs to end, or at least be significantly reduced. I hope the latter because physical activity with plants and nature has always been a joy for me. While working with the Arboretum's plants was the most fun aspect of being Director, the most fulfilling part was occasionally getting someone to appreciate plants, nature or science more. Cudos to the Biology Department for their ongoing work in that regard. The need has never been greater.

With your help, we have seen an end to the threat of a road through the Arboreturn, and the Arboreturn has been expanded. Construction of a new greenhouse is scheduled to start in April, 2019 and a sustainability garden has already taken off in portions of the new area. I anticipate that, following the greenhouse construction, additional parts of the expansion area will be available for increasing botanical diversity in the Arboretum. Although our pine rockland area will sadly be only a thumbnail, I anticipate that additional areas might include things like aroids, bromeliads, aquatic plants, or other plants that would increase educational and/or research value.

I believe that academic and non academic use and appreciation of the Arboreturn has increased in recent years as we published a new catalog, created new signage, and expanded the collection and programing. However, I worry that the University's administration still doesn't truly appreciate the value of the Arboretum. Hopefully, they learned a lot of lessons from Irma and will soon finally complete a "gated road for service vehicles only" between the old and new Arboretum areas that is needed to protect the Arboretum and pedestrians, not to mention complete its obligation to Coral Gables. Maybe even add the Arboretum to freshman orientation? But, unless its football or involves big money, things move VERY slowly here. Even though my retirement has been pending (and even deferred once), no one has yet been hired to replace me. I am afraid that things will slide backwards, especially since some plants are still recovering from Irma or showing delayed affects. The long term objective should be for the Director to be an academic appointment, accompanied by a post doctorate assistant who does research in the Arboretum and a full time horticulturist that also helps the University manage other areas, particularly the Palmetum and the Alexander Biome (which should also be added to the Arboretum). In the short term, the minimum goal should be to hire a full time Director who is paid a living wage and that has both the administrative skills to continue existing programs and horticultural skills that are sorely needed by the University. If progress isn't forthcoming soon, I hope that all of you will speak out about the need to keep care of the Arboretum and fully utilize this valuable resource. A university should also be about teaching proper values, and the University should aspire to be a leader in setting a good example for students, staff and the community in all it does.



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### Geographic Origins of the Gifford Arboretum's Living Plant Collections

#### By: Timothy M. Perez, Gifford Arboretum Curator & Ph.D. Candidate in Biology

Arboreta and botanic gardens are often places where people go to escape the hustle-andbustle of their surrounding urban centers. Within these gardens, visitors can enjoy diverse collections of plants, sometimes originating from distant places. Species from different geographic regions are likely to have evolved in unique communities of plants, animals, and climates. These factors, and others, ultimately influence plant growth forms, flower colors, fruit types, leaf shapes, and other adaptations that augment the aesthetic qualities that we come to associate with plant species and gardens. Although one objective of the Gifford Arboretum is to maintain a representative collection of diverse and culturally important plant species, appreciation for the geographic origins of garden species can easily be overlooked.

Visitors to the Gifford Arboretum that are curious about the origins of a given species can simply view the identification tags mounted on each tree. However, with roughly 500 species it is hard to develop a complete picture of the overall geographic extent represented by the Gifford Arboretum's living plant collections. To help illustrate the geographic and climatic diversity of the Gifford Arboretum's collections, I included two images within this article. The first image shows a map that represents the geographic coverage by our plant collections, and the second depicts the different biomes that are represented within the arboretum.

To depict the geographic diversity represented within Gifford Arboretum, I obtained publicly available occurrence data from the Global Biodiversity Information Facility (GBIF; www.gbif.org). Occurrence data are simply the geographic coordinates where a given species has been documented. These data are particularly useful to conservationists trying to predict where to locate certain species or selecting habitat to protect. After obtaining the occurrence data for each species, I combined them and plotted them on a map. Figure 1 shows the occurrences for all of the species in Gifford Arboretum. In this context, the geographic extent represented in Gifford Arboretum's collections can be better appreciated. For example, it can be seen

that the Arboretum contains species from every continent with the exception of Antarctica. Furthermore, despite Miami's subtropical climate, the Arboretum contains species like Acer rubrum (red maple), a Florida native that also has populations as far north as Canada and has been introduced to Northern Europe. What is also clear from this map, and comes as no surprise, is that the Gifford Arboretum doesn't contain species that are



representative of extremely high latitudes with cold climates. Nevertheless, it is still surprising to learn that the Gifford Arboretum contains some species that are representative of temperate latitudes.

An alternative approach for understanding the geographic diversity of Gifford Arboretum's collections is to consider species' climatic distributions. A common technique used in ecology for predicting where species occur is to superimpose occurrence and climatic data like mean annual temperature and annual precipitation. Mean annual temperature and annual precipitation are also two variables that are classically used to define different biomes. Calculating the average mean annual temperature and average annual precipitation across a given species' distribution can provide an approximation of the biome that a species

is likely to represent. The average climatic distributions for species in the Gifford Arboretum suggest most species hail from six different biomes (Figure 2). Most species are likely to be from tropical seasonal forests or savanna biomes, while only 17 are representative of temperate seasonal forests. The remainder of the biomes represented in Gifford Arboretum's collections in, descending order, are: Woodland/shrubland (23 species), Tropical Rain forest (14 species), Subtropical desert (9 species), and Temperate grassland/desert (2 species).

While this visualization exercise can improve our appreciation for the geographic distributions and biomes represented in the Gifford Arboretum's plant collections, this information can also be of great interest to scientists. The geographic diversity represented within many gar-



Figure 2: The average of species' mean annual temperature and precipitation for each species represented in Gifford Arboretum. Each point represents the mean for a different species. All species are plotted over their representative biome. Biome labels are in the top left corner of the figure. The red dot indicates the biome represented by Gifford Arboretum.

dens provides access to species with vastly different ecological and evolutionary histories. In other words, instead of traveling to distant field sites, scientists can harness the diversity of botanic gardens and arboreta to study ecological and evolutionary patterns in plants. Tropical gardens especially are potentially valuable for this reason because tropical plants are historically understudied compared to plants from temperate areas.

Mapping techniques similar to those above are increasingly used in ecological disciplines to understand why species occur where they do. However, access to this information is not limited to scientists. Anyone who is interested in learning more about species' geographic ranges of can freely access a number of websites to generate their own maps. Popular resources that can be used to visualize species' occurrences include the Global Biodiversity Information Facility (GBIF; www.gbif.org), and the Integrated Digitized Biocollections (www.idigbio.org/portal/ search), and iNaturalist (www.inaturalist.org/observations) websites. With these resources, you can investigate the geographic origins and diversity of your own biological collections and gardens. Happy mapping!

#### Fall 2018 Arboretum Activities

On September 5, the semester got off to a great start when Dr. M. Patrick Griffith, the Executive Director of Montgomery Botanical Center, spoke on "Managing Plant Collections in time of Conservation Threats" to our group. It was an excellent presentation and attracted a standing room only crowd as Dr. Griffith discussed various global threats facing conservation, which range from climate change to wars, poaching and other environmental degradation caused by mankind. It is noteworthy that Dr. Griffith is a leader in planning and preparing for the future by modeling and considering how climate change will impact the property and extensive collections at Montgomery Botanical Center. Other gardens should follow his lead.



On September 23, the Arboretum group and the Dade Chapter of the Florida Native Plant Society enjoyed a tour of the Arboretum's extensive collection of trees and shrubs native to South Florida. The tour was led by Arboretum Director, Steve Pearson and was focused primarily on Exhibit 12, the South Florida Natives, located on both sides of the parking lot that intrudes into the Arboretum. However, it also included other Florida natives and some of their cousins located in other Arboretum Exhibit areas.

On October 3, Mr. Mike Winterstein, an Agricultural Research Technician at the USDA Agriculture Research Service's Subtropical Horticulture Research Station in Miami, presented "USDA/ARS Research at Chapman Field and GRIN Global." He provided a lot of information starting with an overview of the Station, which is also known as "Chapman Field." It is named for an aviator who died in World War I; was selected as a plant introduction station by Dr. David Fairchild; and was a place where Drs. Fairchild and Walter Swingle worked together during its early years. Mr. Winterstein then surveyed some of the remarkable agricultural research that has and continues to be done there; discussed the importance of its germplasm collections; and described some of the current work, which includes helping the cacao industry fight diseases and develop better cultivars; introducing new ornamental species; and distributing plants, cuttings or seeds of many plants important to agriculture. Mr. Winterstein concluded with a description of some of the online resources available from ARS and the USDA, and invited the group to dive in and learn more. GRIN Global is the Germplasm Resource Information Network for the National Plant Germplasm System and can be seen and used at <a href="http://www.ars-grin.gov">http://www.ars-grin.gov</a>. It also connects to lots of other information about ARS and its scientists as well.

On October 17, we enjoyed a Music in the Arboretum performance following a tour of some of the Arboretum trees by Steve Pearson, including *Colvillea racemosa* (Colville's Glory) blooming extensively and for the first time with its characteristic spikes of deep orange and yellow flowers, *Lonchocarpols violaceus* (Lancepod) adorned with masses of lavender flowers, and some interesting, new additions to the Arboretum. Our music performance that evening was by Victor Rubio Carrillo, a very talented graduate student at the Frost School of Music. He plays many instruments but guitar is his primary instrument, along with his voice. Using echo effects he builds original songs that layer sound like one would expect from a group of players. The audience loved it and Victor appeared to relax and increasingly enjoy himself during the performance. He noted what a beautiful place the Arboretum is and said that he was honored to perform there.



On October 25, FIU Senior Instructor in Biology, Dr. John Cozza (who earned his Ph.D. at UM and was the Arboretum's Curator following Hurricanes Wilma and Katrina when the Arboretum was reorganized

and extensively replanted) and current Arboretum Curator, Tim Perez, led a "Sacred and Magical Tree Tour" in the Arboretum. This is always a fun and educational tour, and it is timed to correspond with Halloween. It is highly recommended and should occur again next October.

On November 2 and 9, Steve Pearson and Tim Perez led Arboretum tours as part of a Biology Department sponsored outreach to introduce grade school children to science. The children particularly enjoyed seeing and touching cycads and imaging dinosaurs trying to eat them, tasting some of the fruit in the Arboretum, and smelling aromatic leaves and fruit from plants like allspice, bay rum, and noni.





On November 7, another standing room only crowd came to hear Dr. Richard Campbell present "New and Recommended Mango Varieties, and How to Grow Mangoes Organically." Considered one of the world's foremost authorities on mangoes, Dr. Campbell previously started and led the Tropical Fruit program at Fairchild Tropical Botanic Garden for sixteen years. Today, he is Senior Vice President of Global Operations for Ciruli Brothers, an international fruit grower and vendor that has large mango farms in Mexico and other countries. Dr Campbell also has a local mango business called "The Mango Men" with his sons. Richard comes from a family of great plantsmen and it was nice to see that his children share this passion. The lecture was extremely informative on many levels and a couple of the many lessons were to never put mango fruit in a refrigerator while they are ripening; on the advantages of proper pruning and keeping your mango trees small; and that you don't need irriga-

tion or to fertilize mango trees in our area, excepting possibly occasional applications of potassium.

On November 14, we enjoyed a Music in the Arboretum performance by Jordan Rattner and his Jazz Trio. They played a delightful program of jazz that featured Jordan's guitar on a diverse selection of jazz favorites. All three members were showcased at different times and they all clearly enjoyed playing in the Arboretum. The audience also enjoyed listening to what was a great show in a beautiful location.

On November 17, our Arboretum group had an opportunity to take a walking tour of the Montgomery Botanical Center led by its Director, Dr. Patrick Griffith. MBC contains the best or one of the world's very best collections of palms and cycads, and they are maintained in accordance with the highest standards of horticulture and planted in accordance with a landscaping plan that creates a beautiful garden with incredible vistas

and views. MBC prides itself on maintaining collections of wild collected species, and no other garden in this area comes close to creating and maintaining such scientifically valuable collections. Dr. Griffith and his staff obviously take great pride in their work, and the results were inspiring. Everyone that attended said that it was a great and fun tour!



# New and Exciting Developments at the Arboretum: I. Sustainability Garden in the Arboretum

Most of you know about the new Arboretum expansion area for a new greenhouse, but we have another development that is bringing a whole new realm of opportunity for UM students to learn about and engage with plants! The old dump has now been removed and that area has been rededicated for use for student gardens. Although Biology Professor Kathleen Sealy and Sustainability Coordinator Teddy L'houtellier have also been active in making this happen, the two driving forces behind this development have been Professor Richard Weisskoff and Professor Terri Hood.

The first garden was started in the greenhouse expansion area after Dr. Weisskoff, Professor and Chair, International Studies Department, asked about using part of the area until the greenhouse construction was ready to begin. Steve Pearson agreed and the initial course and garden were a big success. Dr. Weisskoff wrote "The Arboretum has been both cornerstone and lifeblood for two new "Global Food" courses offered by the International Studies Department. On land "lent" temporarily by the Arboretum, 20 students per semester prepare the soil, plant, weed, water, harvest, cook, and compost tropical edible perennials. Steve Pearson's guided tours through the Arboretum also blew our minds and inspired our effort: how varied and how delicious are the tree-ripened fruits growing right on campus!



Dr. Weisskoff (kneeling in front) with some of his students and their first garden

The Students of "Global Food: A Hands-On Approach" thank all the Arboretum's supporters for making our course possible!"



While Dr. Weisskoff may have gotten things started, but Dr. Terri Hood has been the main person driving the conversion of the dump area and starting the first gardens there. Both of these professors are very dedicated to not only teaching students about the importance of plants, but also about how becoming proactive with them can be good for one's health, both mentally and physically, as well as the environment. Cudos and congratulations to both of them for providing a new avenue for UM students to engage with and learn about the world of plants.

Dr. Terri Hood by a banana plant in the new Sustainability Garden/ former dump

# II. New Bench in Arboretum

Thanks are extended to Lynn Meyer, who gifted a beautiful new bench to the Arboretum in remembrance of her deceased husband, former UM Physics Professor Arnold Perlmutter. The bench was designed and built by local plantsman and artist, Lee Cicchella, and adds a new place where Arboretum guests can sit to rest, converse or engage in quiet reflection. Daytime is the best time to appreciate the bench's intricate design, but it has a special magic at night when certain luminescent parts of the design glow in the dark.



UM Law Professor Bernie Perlmutter, son of Arnold Perlmutter, enjoys the new bench with his wife, attorney Pam Chamberlin (left)

A view of the top of the bench as a 'wild and crazy dog' named "Stomper" enjoys a rest in its shade (right)



#### A Very Great Surprise

One of the Arboretum's rarest trees is *Myristica frangrans*, a plant best known for the spices it produces: nutmeg and mace. These were two of the most sought after spices during the spice wars that started in the 15th century and continued into the 17th. These wars were primarily between the Dutch and the Portuguese, but Spain and England also participated.

Growing only in the Moluccas, islands that are part of Indonesia, this species is an evergreen tree that produces small yellow flowers and fruit with a fleshy husk that splits into halves when ripe. Inside is a purplish brown shiny seed with a crimson covering that is called an aril. The seed is the source of nutmeg. and the aril is the source of mace. The leaves are dark green and alternate.



Normally, this species is dioecious, meaning that male and female flowers appear on separate individuals. However, individuals will occasionally produce both kinds of flowers and I am happy to report that the Arboretum's specimen is one of those rare types. It currently has 2 fruit on it! One of these is already opening and, depending on its progress, we may harvest it and examine it more closely at our annual picnic.

#### Beauty and the Beast

A beautiful vine is growing on the oak in Exhibit 10, the Sapindales. It is *Petrea racemosa*, sometimes called queen's wreath or southern wisteria. The vine is a fast grower and has leaves that are rough like sandpaper. It produces large quantities of showy, lavender flowers in the fall. However, it is NOT recommended for wide distribution. The reason is that it seems to be highly invasive and seedlings are regularly pulled in the Arboretum. A preferable species is *Petrea volubis* which looks almost exactly the same, but is not nearly as aggressive in sprouting seedlings.



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EVERY DONATION to the Arboretum is significant and appreciated, and I am very pleased to acknowledge and publicly thank the following recent donors. If I have inadvertently missed anyone, please accept my sincere apology. Everyone who helps is making a difference!

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