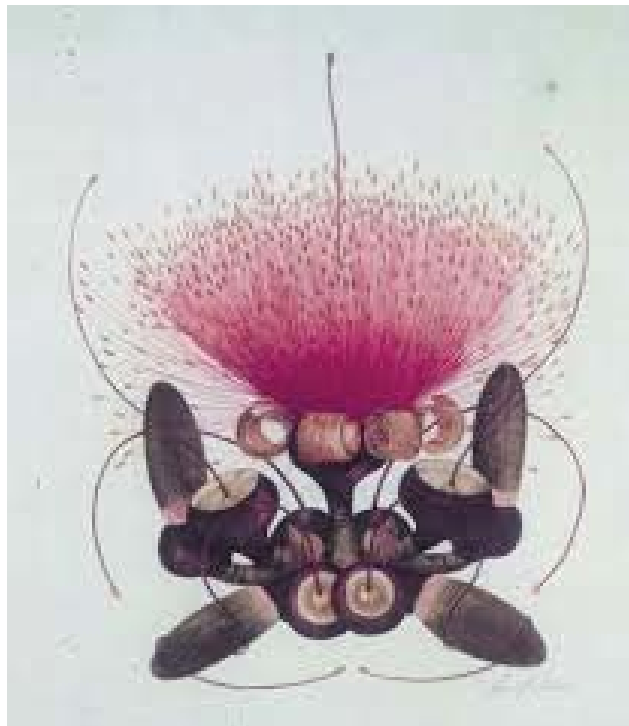


John C. Gifford Arboretum Catalog of Plants



University of Miami

March, 2018

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Introduction

This new Catalog of the trees and plants of the Gifford Arboretum has been in the works for over 3 years. It has been a labor of love, but also much more difficult than anticipated. Part of the difficulty has been taxonomic upheaval as genetic analysis has reordered the taxonomy of many plant species. However, that also makes the catalog all the more timely and needed. It includes plot maps and cross references to hopefully increase its value to users, and it has been paired with the creation and installation of new identification tags that include QR codes for all plants in the Arboretum. These codes allow guests to learn about the plants right as they stroll through the Arboretum. QR reader apps are free and easy to download to a smart phone, and they greatly increase the educational value of the Arboretum to you.

Special thanks are due to those who worked on the new Catalog, including Aldridge Curators Anuradha Gunathilake, Wyatt Sharber, Luis Vargas, and Christine Pardo, as well as volunteers and members of the Gifford Arboretum Advisory Committee, Julie Dow and Lenny Goldstein. Ms. Dow in particular deserves special thanks for the great work she did in helping to complete Exhibit 12 – The South Florida Natives. Most especially, I want to thank Samer Zafar for her tireless and great work in creating QR codes and assembling this catalog.

A Brief History of the Gifford Arboretum

The Arboretum was started in 1947 by Dr. Frank J. Rimoldi and Dr. Roy Woodbury, professors of tropical botany at the University of Miami. Over 350 plants were donated from local, state, and federal nurseries and supporters to plant the initial Arboretum. In 1949, the Arboretum was named in honor of Dr. John C. Gifford, the first graduate forester in the United States, an expert on tropical woods, and a professor of tropical forestry at the University of Miami. In 1950, the Gifford Society of Tropical Botany was formed to promote the study of tropical plants, and the Arboretum grew to more than 500 plants. During the following decades, many students, professors, and community members used the arboretum for teaching, research and recreation. However, in the late 1980's, the need for additional campus parking threatened the existence of the Gifford Arboretum. Through the efforts of Coral Gables tree activist, Kathy Gaubatz, the University of Miami gave full support to the renovation and enhancement of the Gifford Arboretum in 1992.

After the Arboretum survived Hurricane Andrew with little damage, no one was expected the destruction that Hurricanes Katrina and Wilma inflicted on the Arboretum, with losses of almost half of the trees in the collection. Professor Carol Horvitz then took on the task of renovating the Arboretum and, thanks to her tireless work, the Arboretum received two grants from the IMLS (Institute for Museum and Library Services). Approximately 200 new trees were planted in the Arboretum during its renovation and the current 14 Exhibit organizational structure was created at that time. More recently the Arboretum survived Hurricane Irma in September, 2017.

The Arboretum is a collection of trees and plants maintained for education and research purposes, with interpretive signage and individual identification tags on each plant. The Arboretum is also a place of peace and for connection with nature, and an additional purpose of the Arboretum and its programs is to inspire greater interest in tropical plants and a better understanding of their importance.

Stephen D. Pearson is the current Director of the Gifford Arboretum and has added many more species to the collection. Come and enjoy the trees of the Gifford Arboretum - they are there just for you!

How to Use this Catalog

Following a map of the entire Gifford Arboretum showing the locations of each of the 14 Exhibit areas in the Arboretum, each exhibit then has its own section that includes a general introduction to the plants featured in the exhibit, a plot map, and detailed listings of the plants. The first 11 exhibits are based on botanical groupings, and the last 3 exhibits are based on thematic groupings. Besides having a numeric designation, each exhibit area also has a distinct color designation on its signs so that guests can locate each exhibit's trees more easily.

The plant listings in each exhibit section are broken into 3 subsections. The first subsection contains, in alphabetical order, a list of all of the plants planted in that exhibit's area that botanically fit or, for thematic exhibits, "belong" in that exhibit. For illustrative purposes we will use Exhibit 1 – The Areaceae (Palms) in this discussion. Thus, the list in the first subsection of Exhibit 1 would include a list of all the palms that are planted in the Exhibit 1 area. These will all have a one or two numeral designation although it is possible that some may also have a letter designation if the palm was added after the initial list was created, i.e. 16a.

However, it is impossible to group plants in any strict groupings in the Gifford Arboretum. Since the Arboretum was started in 1947 and has followed various organizational structures over the years, there are various old trees in our newly created exhibit designations that don't correspond to the new exhibit parameters. Accordingly, for example, one can find palms planted in several other Arboretum exhibit areas besides Exhibit 1, and the second subsection of Exhibit 1 consists of a list of all palms that are planted in other exhibit areas. These may be old palms where to move them would be both expensive and risky, or it may be palms that are appropriately planted in thematic exhibits like Exhibit 12 – South Florida Natives or Exhibit 14 – Maya Cocoa Garden, but we simply do not have the space to have repeated plantings of the same species. Also, while we try to follow the exhibit schemes as much as possible with new plantings, in some instances horticultural reasons may dictate that a species be planted in a different area. However, the value of the second subsection is that one can easily identify all the plants in the Gifford Arboretum that fit an exhibit's parameters. Thus, for example, by looking at the first and second subsections of the catalog section for Exhibit 1, one has a list (and locations) of every palm planted in the Gifford Arboretum. This occurs in every exhibit section so that the first two subsections contain a list of every tree and plant that fits each exhibit's parameters.

The third subsection of each exhibit is a list of trees and plants that are planted in an exhibit area where they do not belong botanically or thematically. Thus, for example, in the Exhibit 1 area, there is an *Enterolobium cyclocarpum* (Guanacaste) that is a magnificent, large specimen tree that must have been planted long ago. However, even though it is a member of the Fabaceae family and therefore doesn't belong in a palm exhibit area, it would be ridiculous to try to move it today and risk destroying its natural structure or, worse, killing the tree just for botanical purity. In adding new trees, we try to follow the exhibits' scheme but, in a few instances, horticultural needs dictate the planting of some trees in areas that do not correspond to their botanical identity. Trees that are planted in an exhibit area where they do NOT fit botanically or thematically are designated with 3 numeral numbers starting with 100 and, where applicable, they are cross referenced in the exhibit where they belong technically. Thus, the *Enterolobium cyclocarpum* would also be listed and cross-referenced in subsection two of Exhibit 6 – Fabaceae.

To summarize, in each exhibit, plants with an identification number of 1 to 99 in that exhibit are plants that botanically or thematically belong in the exhibit area where they are planted based on that exhibit's name. Plants with an identification number of 100 or higher do not technically belong, but they are nevertheless planted in that exhibit area. In each exhibit area, one can also ascertain all the plants in the Arboretum that fit the parameter of that exhibit's name by looking at subsection one (plants in the exhibit area) and at subsection two (plants in other exhibit areas) that fit the exhibit's name parameter.

While it has been the goal to be as accurate as possible in creating this Catalog, there are undoubtedly some errors. While it is hoped that those are not too many, your identifying errors will be welcomed and appreciated. While there will always be areas where improvement in this catalog is possible, it is a success if it provides a platform that benefits the Arboretum's educational purposes and that can be improved upon over time.

Special Note - The Arboretum lost many plants during Hurricane Irma as well as after the storm when there was no irrigation for 6 months. Due to the losses and the delays in replacing plants because of the lack of irrigation, some plants that are intended to be replaced are included in the catalog even though they are not yet planted in the Arboretum. We have designated those plants that are not present with an asterisk next to the names of the applicable plants in the exhibit maps. As those species are added, the asterisks will be removed.

- Gifford Arboretum Exhibit Areas**
1. Arecaceae
 2. Euphorbiaceae & Other Malpighiales
 3. Gymnosperms
 4. Moraceae & Other Rosales
 5. Sapotaceae & Other Ericales
 6. Fabaceae
 7. Bignoniaceae
 8. Myrtales
 9. Basal Angiosperms
 10. Sapindales
 11. Malvales
 12. South Florida Natives
 13. What is a Tree?
 14. Maya Cocoa Garden

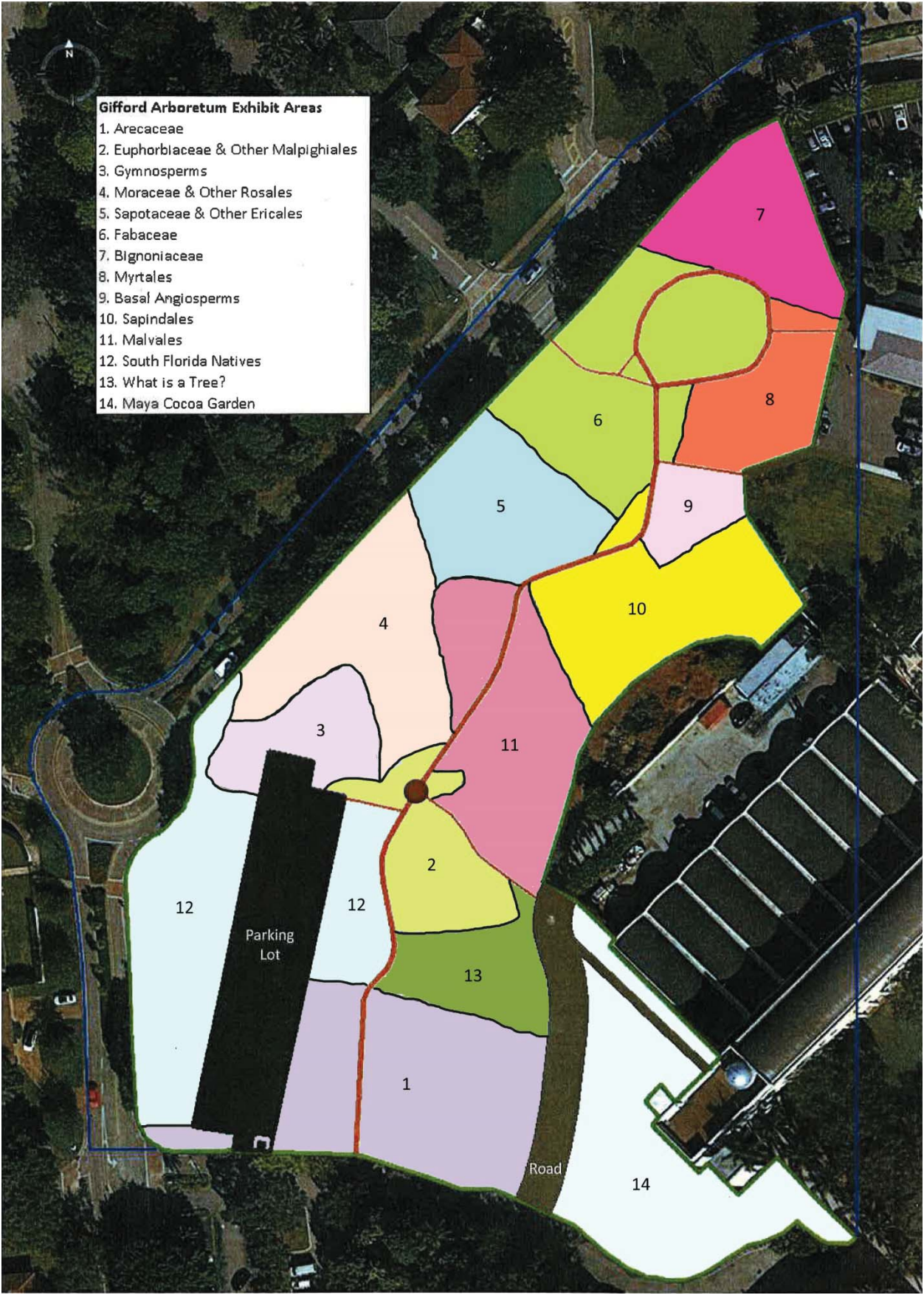


Exhibit 1- Arecaceae

While many trees have beautiful shapes and structures, the Arecaceae family can rightfully be regarded as the most architectural elements of the plant world. Known commonly as the palm family, they span the globe with 184 genera containing approximately 2,400 species.

Beginning approximately 80 million years ago, palms evolved into a highly diverse family of flowering plants. The family includes species like the Bismarck palm (*Bismarckia nobilis*) that have massive single trunks and large, stiff leaves (“fronds”) shaped like fans (“palmate”). On the other end of the spectrum are palms like *Chamaedorea metallica*, a small slender palm with feather-like leaves (“pinnate”). A well-known example of a palm with pinnate leaves is the coconut (*Cocos nucifera*).

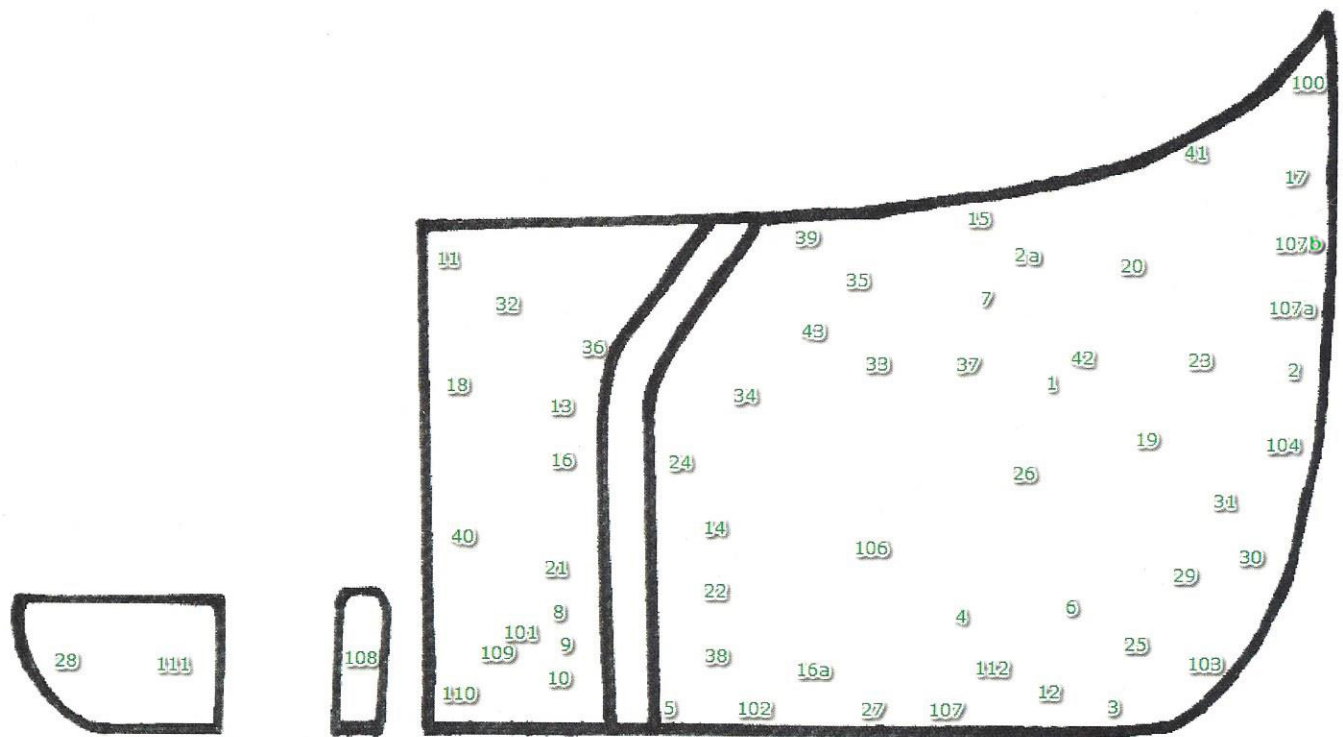
At the Gifford Arboretum, visitors can see those palms as well as many others, including three palm species that are very important on a global, economic basis. The first of these is the African oil palm (*Elaeis guineensis*), a species of African origin but where commercial production has come to increasingly be dominated by large groves in Malaysia and Indonesia. This palm is the source of the palm oil used in the production of many foods. More recently, it has also been used to produce biodiesel fuels. Today, worldwide production of palm oil from *Elaeis guineensis* surpasses 160 million tons per year.

A second economically important palm that was recently added to the Arboretum is the peach palm (*Bactris gasipaes*). Native to the tropical forests of South and Central America, this species has been used for centuries for food by native peoples. The fruit superficially resembles a peach and its pulp is eaten both raw and cooked. The fruits of this palm are also eaten by many species of birds, including macaws, parrots and parakeets. Today, *Bactris gasipaes* is being widely cultivated in the Amazon region of Brazil and parts of Costa Rica as a commercial source of heart of palm. This is an excellent example of sustainable agriculture because harvesting heart of palm usually entails killing the source palm to extract the one and only terminal bud. However, *Bactris gasipaes* is a multi-stemmed palm species, so farmers can harvest hearts of palm from some stems while the remaining stems continue to live. The plant also sprouts new stems. Unlike most *Bactris gasipaes* specimens, the one growing in the Arboretum is a spineless cultivar.

Another economically very important palm that is found in the Arboretum is the coconut (*Cocos nucifera*), a palm that is ubiquitous throughout the tropics. It was domesticated in ancient times from ancestors growing in the Malay Archipelago region. While it undoubtedly spread by seeds floating in ocean currents, its dispersal was also occasioned by seafaring peoples. Early explorers loaded coconuts onto their ships because they could be stored for extensive periods of time as a source of water and food. However, early voyagers also planted groves of coconuts along their shipping routes so that these stores could be replenished. Besides being an important source of food and water, coconut leaves and husks have been widely used for construction of shelter. An oil derived from coconut is also used in cooking, as well as in the production of margarine, soaps and cosmetics. Today, coconut remains an important sustenance food in many parts of the world.

Florida has 12 native palm species, but only one of these is endemic to Florida (*Sabal etonia*, which grows in central Florida). At the Arboretum, visitors can study native palms like Florida's State Tree, the cabbage or sabal palm (*Sabal palmetto*), as well as royal palm (*Roystonea regia*), Everglades or Paurotis palm (*Acoelorrhaphe wrightii*), silver palm (*Coccothrinax agentata*), Florida thatch palm (*Thrinax radiata*), as well as the endangered Sargent's cherry palm or buccaneer palm (*Pseudophoenix sargentii*), where naturally growing specimens are now found in Florida only on Elliott Key.

Exhibit 1 – Arecaceae



- | | | |
|---|--|--|
| 1 <i>Acoelorrhaphe wrightii</i> | 22,23 <i>Hyophorbe verschaffeltii</i> | <u>Non-Arecaceae</u> |
| 2 <i>Aiphanes horrida</i> | 24 <i>Lantania loddigesii</i> | 100 <i>Albizia niopoides</i> var. <i>niopoides</i> |
| *2a. <i>Areca catechu</i> | 25 <i>Latania lontaroides</i> | 101 <i>Enterolobium cyclocarpum</i> |
| 3 <i>Bactris gasipaes</i> | 25a. <i>Leucothrinax morrisii</i> | 102 <i>Ipomoea carnea</i> |
| 4 <i>Bismarckia nobilis</i> | 26 <i>Licuala peltata</i> var. <i>sumawongii</i> | 103,104 <i>Jasminum sambac</i> |
| 5, 6 <i>Carpentaria acuminata</i> | 27 <i>Livistona chinensis</i> | 106 <i>Leucaena esculanta</i> |
| 7 <i>Caryota mitis</i> | 28 <i>Phoenix canariensis</i> | 107 <i>Lonchocarpus violaceus</i> |
| 8,9,10 <i>Chamaedorea metallica</i> | 29,30,31 <i>Pseudophoenix sargentii</i> | 107a <i>Pereskia grandifolia</i> |
| 11 <i>Chamaedorea seifrizii</i> | 32 <i>Rhapis excelsa</i> | 107b. <i>Pereskia bleo</i> |
| 12 <i>Chamaerops humilis</i> var. <i>cerifera</i> | 33 <i>Roystonea oleracea</i> | 108 <i>Pseudobombax ellipticum</i> |
| 13,14,15 <i>Chambeyronia macrocarpa</i> | 34,35 <i>Roystonea regia</i> | 109 <i>Rhipsalis baccifera</i> |
| 16 <i>Coccothrinax argentata</i> | 36 <i>Sabal Mexicana</i> | 110 <i>Sanchezia speciosa</i> |
| 16a <i>Coccothrinax</i> sp. 'azul' | 37 <i>Saribus rotundifolius</i> | 111 <i>Tipuana tipu</i> |
| 17 <i>Cocos nucifera</i> | 38 <i>Syagrus coronata</i> | 112 <i>Zamia furfuracea</i> |
| 18 <i>Dypsis lutescens</i> | 39 <i>Syagrus romanzoffiana</i> | |
| 19 <i>Dypsis pembana</i> | 40 <i>Tahina spectabilis</i> | |
| 20 <i>Elaeis guineensis</i> | 41 <i>Thrinax radiata</i> | |
| 21 <i>Hyophorbe lagenicaulis</i> | 43 <i>Veitchia arecina</i> | |

Arecaceae

Exhibit 1 - Color Code

Representative species in the Arecaceae Exhibit

Identification Number	Order	Family	Subfamily	Genus & Species	Common Name	Area of Origin/Distribution
1	Arecales	Arecaceae	Coryphoideae	<i>Acoelorrhaphe wrightii</i>	Everglades Palm, Paurotis Palm	Native-South Florida Everglades, West Indies, Central America
2	Arecales	Arecaceae	Arecoideae	<i>Aiphanes horrida f/k/a Aiphanes aculeata</i>	Ruffle Palm	South America
2a	Arecales	Arecaceae	Arecoideae	<i>Areca catechu</i>	Betel Palm	Philippines/Tropical Pacific
3	Arecales	Arecaceae	Arecoideae	<i>Bactris gasipaes</i>	Peach Palm	Central and South America
4	Arecales	Arecaceae	Coryphoideae	<i>Bismarckia nobilis</i>	Bismarck Palm	Madagascar
5, 6	Arecales	Arecaceae	Arecoideae	<i>Carpentaria acuminata</i>	Carpentaria Palm	Northern Australia
7	Arecales	Arecaceae	Coryphoideae	<i>Caryota mitis</i>	Clustering Fishtail Palm	Burma, Malaysia (Naturalized)
8, 9, 10	Arecales	Arecaceae	Arecoideae	<i>Chamaedorea metallica</i>	Metallic Palm	Endemic to Southern Mexico
11	Arecales	Arecaceae	Arecoideae	<i>Chamaedorea seifrizii</i>	Bamboo Palm	Central and South America
12	Arecales	Arecaceae	Coryphoideae	<i>Chamaerops humilis var. cerifera</i>	European Fan Palm (blue form)	Continental Europe and Northwest Africa
13, 14, 15	Arecales	Arecaceae	Arecoideae	<i>Chambeyronia macrocarpa</i>	Chamberonia Palm	New Caledonia
16	Arecales	Arecaceae	Coryphoideae	<i>Coccothrinax argentata</i>	Silver Thatch Palm	Native-South Florida, southeast Mexico, the Bahamas and the Cayman Islands
16a	Arecales	Arecaceae	Coryphoideae	<i>Coccothrinax sp. 'azul'</i>	N/A	Cuba
17	Arecales	Arecaceae	Arecoideae	<i>Cocos nucifera</i>	Coconut Palm	Pantropical (Naturalized)
18	Arecales	Arecaceae	Arecoideae	<i>Dypsis lutescens</i>	Yellow Butterfly Palm	Madagascar
19	Arecales	Arecaceae	Arecoideae	<i>Dypsis pambana</i>	Pemba Palm	Tanzania
20	Arecales	Arecaceae	Arecoideae	<i>Elaeis guineensis</i>	African Oil Palm	West Africa
21	Arecales	Arecaceae	Arecoideae	<i>Hyopharbe lagenicaulis</i>	Bottle Palm	Mascarene Island (Indian Ocean)
22, 23	Arecales	Arecaceae	Arecoideae	<i>Hyopharbe verschaffeltii</i>	Spindle Palm	Mascarene Island (Indian Ocean)
24	Arecales	Arecaceae	Coryphoideae	<i>Latania loddigesii</i>	Blue Latan Palm	Madagascar
25	Arecales	Arecaceae	Coryphoideae	<i>Latania lontaroides</i>	Red Latan Palm	Mascarene Island (Indian Ocean)
25a	Arecales	Arecaceae	Coryphoideae	<i>Leucothrinax morrisii</i>	Key Thatch Palm	Florida Keys and Caribbean
26	Arecales	Arecaceae	Coryphoideae	<i>Licuala peltata var. sumawongii</i>	Fan Palm	Myanmar, Malaysia
27	Arecales	Arecaceae	Coryphoideae	<i>Livistona chinensis</i>	Chinese Fan Palm, Fountain Palm	Southern Japan, Taiwan
28	Arecales	Arecaceae	Coryphoideae	<i>Phoenix Canariensis</i>	Canary Island Date Palm or Pineapple Palm	Canary Islands
29, 30, 31	Arecales	Arecaceae	Ceroxyloideae	<i>Pseudophoenix sargentii</i>	Buccaneer Palm	Florida, Yucatan, Cuba and Hispanola
32	Arecales	Arecaceae	Coryphoideae	<i>Rhapis excelsa</i>	Lady Palm	Southeast China
33	Arecales	Arecaceae	Arecoideae	<i>Roystonea oleracea</i>	Caribbean Royal Palm	Northern South America, Lesser Antilles
34, 35	Arecales	Arecaceae	Arecoideae	<i>Roystonea regia (-R. elata)</i>	Royal Palm	Native- Florida, United States, & Cuba; Mexico, Belize, Honduras.
36	Arecales	Arecaceae	Coryphoideae	<i>Sabal mexicana</i>	Mexican Palmetto, Texas Palmetto	North America especially Mexico and Texas
37	Arecales	Arecaceae	Coryphoideae	<i>Saribus rotundifolius</i>	Footstool Palm	Southeast Asia and Philippines
38	Arecales	Arecaceae	Arecoideae	<i>Syagrus coronata</i>	Licari Palm	Brazil/ Important food of tropical rainforest animals
39	Arecales	Arecaceae	Arecoideae	<i>Syagrus romanzoffiana</i>	Queen Palm	Southeast Brazil to Northeast Argentina, East Paraguay
40	Arecales	Arecaceae	Coryphoideae	<i>Tahina spectabilis</i>	Tahina Palm	Madagascar/ Recently discovered large monocarpic palm
41	Arecales	Arecaceae	Coryphoideae	<i>Thrinax radiata</i>	Florida Thatch Palm, Caribbean Thatch Palm	South Florida, Keys, Bahamas Islands, Central America, West Indies
43	Arecales	Arecaceae	Arecoideae	<i>Veitchia arecina</i>	Arecina Palm	South Pacific Islands, Vanuatu

Arecaceae Species Planted in other Gifford Arboretum Exhibits

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	Location in G.A.
1 - 4	Arecales	Arecaceae	Coryphoideae	<i>Acoelorrhaphe wrightii</i>	Everglades Palm, Paurotis Palm	Native-South Florida Everglades, West Indies, Central America	Exh. 14 - Maya Cocoa
8	Arecales	Arecaceae	Arecoideae	<i>Attalea cohune</i>	American Oil Palm, Cohune Palm	Mexico, Central America	Exh. 14 - Maya Cocoa
100	Arecales	Arecaceae	Coryphoideae	<i>Bismarckia nobilis</i>	Bismarck Palm	Madagascar	Exh. 14 - Maya Cocoa
23 - 26	Arecales	Arecaceae	Arecoideae	<i>Cocos nucifera</i>	Coconut Palm	Pantropical (Naturalized)	Exh. 14 - Maya Cocoa
47 - 54	Arecales	Arecaceae	Coryphoideae	<i>Sabal palmetto</i>	Sabal Palm/Cabbage Palm	Native- South Carolina to South Florida, Bahamas	Exh. 14 - Maya Cocoa
107	Arecales	Arecaceae	Coryphoideae	<i>Sabal palmetto</i>	Sabal Palm/Cabbage Palm	Southern United States, Caribbean	Exh. 6 - Fabaceae
63, 64, 65	Arecales	Arecaceae	Coryphoideae	<i>Sabal palmetto</i>	Sabal Palm, Cabbage Palm	South Carolina to South Florida, Bahamas	Exh. 12 South Florida Natives
55	Arecales	Arecaceae	Coryphoideae	<i>Sabal yapa</i>	Huano Palm	Belize, Guatemala, Western Cuba and the Yucatan Peninsula	Exh. 14 - Maya Cocoa
67a	Arecales	Arecaceae	Coryphoideae	<i>Serona repens</i>	Saw Palmetto	Southeastern US	Exh. 12 - South Florida Natives
107	Arecales	Arecaceae	Arecoideae	<i>Syagrus romanzoffiana</i>	Queen Palm	Southeast Brazil to Northeast Argentina, East Paraguay	Exh. 14 - Maya Cocoa

Non-Representative Species Planted in the Arecaceae Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	G.A. Exhibit in which Non-Arecaceae Species Belong, if any
100	Fabales	Fabaceae	Mimosoideae	<i>Albizia niopoides var niopoides</i>	Tantakayo Albizia	Central and South America	Exh. 6 - Fabaceae
101	Fabales	Fabaceae	Mimosoideae	<i>Enterolobium cyclocarpum</i>	Guanacaste, Ear-pod tree, parota, huanacastle	Central America, Mexico to Colombia	Exh. 6 - Fabaceae, Exh. 14 - Maya Cocoa
102	Solanales	Convolvulaceae	N/A	<i>Ipomoea carnea</i>	Shrub Morning Glory	Mexico, Central America, South America	Exh. 14 - Maya Cocoa
103, 104	Scrophulariales	Oleaceae	N/A	<i>Jasminum sambac</i>	Arabian Jasmine	Southeast Asia	N/A
106	Fabales	Fabaceae	Mimosoideae	<i>Leucaena esculenta</i>	Esulent Leadtree, Guaje	Mexican highlands	Exh. 6 - Fabaceae
107	Fabales	Fabaceae	Papilionoideae	<i>Lonchocarpus violaceus</i>	Lancepod, West Indian Lilac	West Indies and northern South America	Exh. 6 - Fabaceae
107a	Caryophyllales	Cactaceae	Pereskioideae	<i>Pereskia grandifolia</i>	Rose Cactus	NE Brazil	N/A
107b	Caryophyllales	Cactaceae	Pereskioideae	<i>Pereskia blea</i>	Leaf Cactus	Central America	N/A
108	Malvales	Malvaceae	Bombacoideae	<i>Pseudobombax ellipticum</i>	Shaving Brush (pink)	Southern Mexico and Central America	Exh. 11 - Malvales, Exh.14 - Maya Cocoa
109	Caryophyllales	Cactaceae	Cactoideae	<i>Rhipsalis baccifera</i>	Mistletoe Cactus	Central America, South America, the Caribbean and Florida	Exh.14 - Maya Cocoa
110	Lamiales	Acanthaceae	N/A	<i>Sanchezia speciosa</i>	Sanchezia, Shrubby Whitevein	Peru and Ecuador	N/A
111	Fabales	Fabaceae	Papilionoideae	<i>Tipuana tipu</i>	Pride of Bolivia, Rosewood	Bolivia, Argentina, Brazil	Exh. 6 - Fabaceae
112	Cycadales	Zamiaceae	Zamiodeae	<i>Zamia furfuracea</i>	Cardboard Palm	Eastern Mexico	Exh. 3 - Gymnosperms, Exh. 14 - Maya Cocoa

Exhibit 2 - Euphorbiaceae and Other Malpighiales

The Malpighiales are a botanical order that contains 35 families, including the Euphorbiaceae or spurge family. The Euphorbiaceae contains a strange and seemingly disparate mix of plants that are further broken down into at least 4 subfamilies. Most of those subfamilies, and examples of their species, can be seen in the Arboretum.

The Acalyphoideae subfamily includes chenille (*Acalypha hispida*) a colorful, but cold sensitive, ornamental shrub grown primarily for its attractive, long racemes of red flowers. Another member is the coral tree (*Macaranga mappa*), a large shrub or small tree that has large rounded leaves and interesting flowers that are pink and, on the males, held in inflorescences that resemble certain corals. This species is native to the Philippines, but has become invasive in Hawaii. Traditionally, its leaf ash was eaten as a cure for enlarged bellies, and twine made from the bark and its wood was used for making fishing spears. In Florida, it is grown as an ornamental and has not shown any known propensity to be invasive.

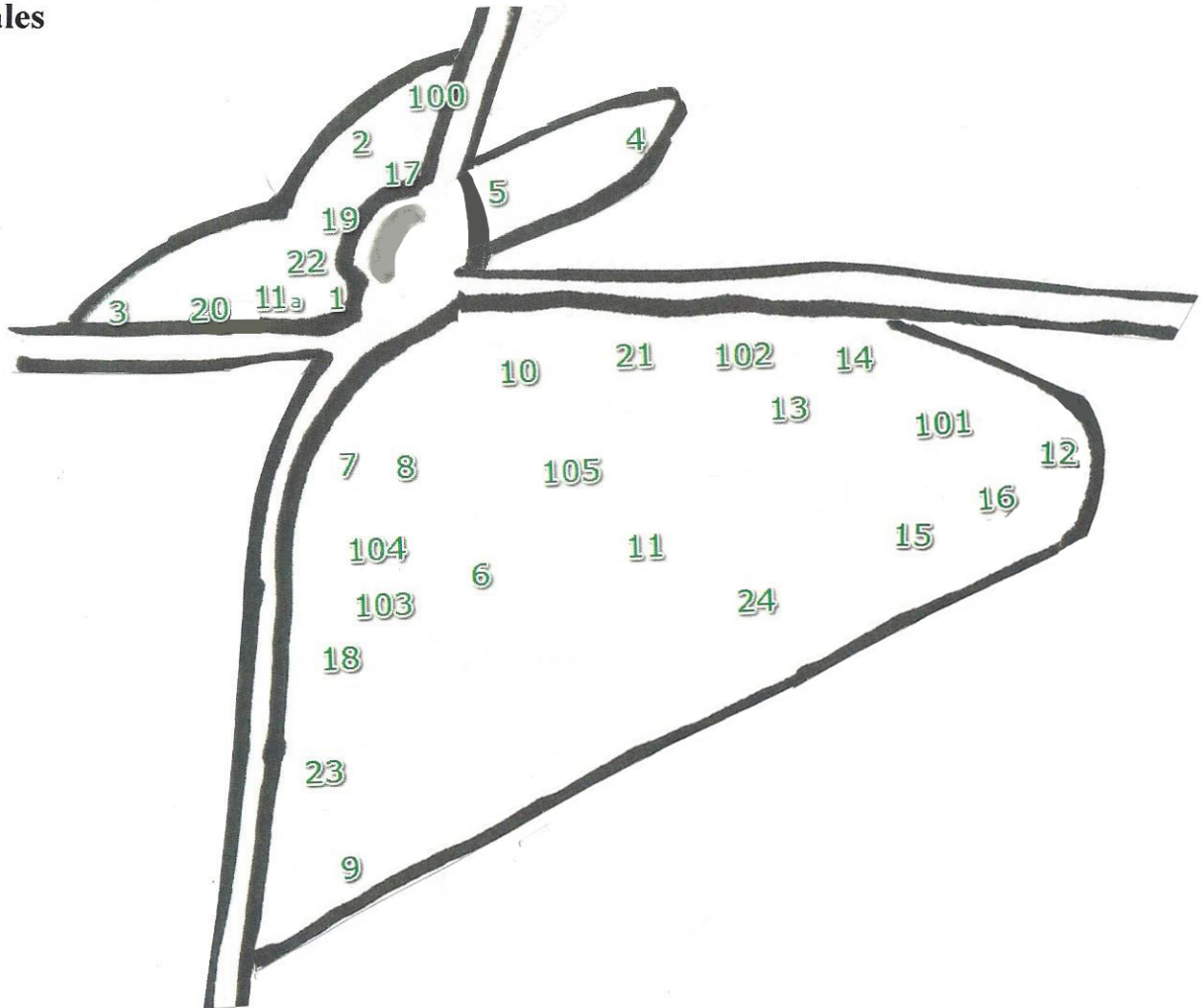
The Crotonoideae subfamily includes the colorfully leaved “crotons” that are very popular as landscaping plants. However, despite this common name, those plants are actually *Codiaeum variegatum*, from a different genus. The members of the *Croton* genus, are far less colorful as can be seen in *Croton linearis*, a shrub native to pine rockland in South Florida and the Keys.

Finally, the large Euphorbioideae subfamily includes the *Euphorbia* genus, which ranges from the popular poinsettia or Christmas flower (*Euphorbia pulcherrima*) to many cactus-like plants and herbaceous spurges. Although most members of this family are not edible and some are very poisonous, it also includes cassava (*Manihot esculenta*), an important food source for its starchy roots. In contrast, the genus *Hura* includes the infamous sandbox tree (*Hura crepitans*), which produces caustic sap that is also highly poisonous. It also bears fruit whose explosive dehiscence can propel its seeds over 50 yards through the air! This gives the tree another common name as the “dynamite tree” since the fruit explosions can be quite loud.

Historically, the most economically important member of the Euphorbiaceae family has been the rubber plant, *Hevea brasiliensis*. This native of Brazil was identified as the best source of latex (a creamy gum that is exuded when the plants are wounded, and that is the raw form of rubber). Other sources of latex include certain members of the *Ficus* genus (Moraceae) and the vine *Landolphia* (Apocynaceae). Interestingly, the term “rubber” came from an English chemist who discovered that balls of latex could be used to “rub out” pencil marks. Although synthetic rubber was developed during World War II and it has since come to replace many of the former applications for latex, natural rubber still fills special but important niche uses like making airplane tires and condoms.

Another important Malpighiales family is the Malpighiaceae. It includes acerola or Barbados cherry (*Malpighia emarginata*), a shrub or small tree that produces refreshing, red fruit that are high in vitamin C; peanut butter fruit (*Bunchosia argentea*), with fruit that turn reddish orange when ripe and have a flavor that resembles peanut butter; and nance (*Byrsonima crassinifolia*), a slow-growing, medium to large tree that produces a tropical, cherry-like fruit that was eaten by the Mayans.

**Exhibit 2 –
Euphorbiaceae and Other
Malpighiales**



- 1. *Acalypha hispida*
- 2 *Antidesma bunius*
- 3 *Bridelia cathartica*
- 4 *Byrsonima crassifolia*
- 5 *Byrsonima lucida*
- 6 *Bunchosia argentea*
- 7,8 *Codiaeum variegatum* cv.
- 9 *Croton linearis*
- 10 *Erblichia odorata*
- 11 *Euphorbia arbuscula*
- 11a. *Euphorbia continifolia*

- 12 *Euphorbia lactea* var. *cristata*
- *13 *Euphorbia leucocephala*
- 14 *Euphorbia pulcherrima*
- 15 *Euphorbia punicea*
- 16 *Euphorbia tithymaloides*
- 17 *Garcia nutans*
- 18 *Heteropterys angustifolia*
- 19 *Hura crepitans*
- 20 *Macaranga mappa*
- 21 *Malpighia emarginata*

22 *Reutealis* (= *Aleurites*)
trisperma

- 23 *Rheedia brasiliensis*
- 24 *Sauropus androgynous*

Non-Malpighiales

- 100 *Bulnesia arborea*
- 101 *Cameraria latifolia*
- 102 *Cassia alata* (= *Senna alata*)
- 103 *Platyceium bifurcatum*
- 104 *Swietenia mahagoni*
- 105 *Vangueria infausta*

Euphorbiaceae and Other Malpighiales

Exhibit 2 - Color Code =

Representative Species in the Euphorbiaceae and other Malpighiales Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin
1	Malpighiales	Euphorbiaceae	Acalyphoideae	<i>Acalypha hispida</i>	Chenille Plant, Fox Tail, Red Hot Cat's Tail	Oceania
2	Malpighiales	Phyllanthaceae	Antidesmatoideae	<i>Antidesma bunius</i>	Bigday, Chinese Laural	Southeast Asia, Northern Australia
3	Malpighiales	Phyllanthaceae	Phyllanthoideae	<i>Bridelia cathartica</i>	Blue Sweetberry	Mozambique, Zimbabwe
4	Malpighiales	Malpighiaceae	Byrsominoideae	<i>Byrsonima crassifolia</i>	Nance, Golden Spoon, Savanna Serrette	Central and South America
5	Malpighiales	Malpighiaceae	Byrsominoideae	<i>Byrsonima lucida</i>	Locust Berry	South Florida, West Indies
6	Malpighiales	Malpighiaceae	Malpighioideae	<i>Bunchosia argentea</i>	Peanut Butter Fruit	Central and South America
7, 8	Malpighiales	Euphorbiaceae	Crotonoideae	<i>Codiaeum variegatum</i> cv.	Croton	Indonesia, Australia, South Pacific
9	Malpighiales	Euphorbiaceae	Crotonoideae	<i>Croton linearis</i>	Pineland Croton	South Florida, Florida Keys and West Indies
10	Malpighiales	Passifloraceae	Turneroideae	<i>Erblichia odorata</i>	Flor de Fuego, Butterfly Tree	Southern Mexico to Panama
11	Malpighiales	Euphorbiaceae	Euphorbioideae	<i>Euphorbia arbuscula</i>	Stick Euphorbia	Endemic to Socotra archipelago, Yemen
11a	Malpighiales	Euphorbiaceae	Euphorbioideae	<i>Euphorbia continifolia</i>	Smoketree Spurge	Mexico, South America
12	Malpighiales	Euphorbiaceae	Euphorbioideae	<i>Euphorbia lactea</i> var. <i>cristata</i>	Elkhorn, Frilled fan	Tropical Asia, India
13	Malpighiales	Euphorbiaceae	Euphorbioideae	<i>Euphorbia leucocephala</i>	Little Christmas Flower	Southern Mexico to El Salvador
14	Malpighiales	Euphorbiaceae	Euphorbioideae	<i>Euphorbia pulcherrima</i>	Poinsettia	Mexico and Central America
15	Malpighiales	Euphorbiaceae	Euphorbioideae	<i>Euphorbia punicea</i>	Scarlet Spurge, Flame of Jamaica	Jamaica
16	Malpighiales	Euphorbiaceae	Euphorbioideae	<i>Euphorbia tithymaloides</i>	Fiddle Flower, Myrtle-leaved Spurge	Tropical North and Central America
17	Malpighiales	Euphorbiaceae	Crotonoideae	<i>Garcia nutans</i>	Garcia	Colombia: moist forest
18	Malpighiales	Malpighiaceae	Malpighioideae	<i>Heteropterys angustifolia</i>	Mariposa, Red Wing	South Brazil, Paraguay, Uruguay and NW Argentina
19	Malpighiales	Euphorbiaceae	Crotonoideae	<i>Hura crepitans</i>	Sandbox Tree, Dynamite Tree	West Indies, Costa Rica to Ecuador
20	Malpighiales	Euphorbiaceae	Acalyphoideae	<i>Macaranga mappa</i>	Bingbong, Parasol Leaf, Coral Tree	Philippines
21	Malpighiales	Malpighiaceae	Malpighioideae	<i>Malpighia emarginata</i>	Barbados Cherry, Acerola	Yucatan, Mexico
22	Malpighiales	Euphorbiaceae	Crotonoideae	<i>Reutealis (= Aleurites) trisperma</i>	Philippine Tung	Endemic to Philippines
23	Malpighiales	Clusiaceae	Clusioidae	<i>Rhedia brasiliensis</i>	Bakupari	Southeastern Brazil
24	Malpighiales	Phyllanthaceae	Phyllanthoideae	<i>Sauropus androgynus</i>	Sweet Leaf, Katuk, Star Gooseberry	Tropical Asia

Euphorbiaceae and other Malpighiales Species Planted in Other Arboretum Exhibits

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	Location
102	Malpighiales	Chrysobalanaceae	N/A	<i>Chrysobalanus icaco</i>	Coco plum	Tropical Americas, Florida	Exh. 10 - Sapindales
24	Malpighiales	Clusiaceae	Clusioidae	<i>Clusia rosea</i>	Pitch apple	Florida, Caribbean, Cuba, Puerto Rico	Exh. 12 - South Florida Native
22	Malpighiales	Euphorbiaceae	Crotonoideae	<i>Cnidoscolus aconitifolius</i>	Mayan Tree Spinach	Mexico to Brazil	Exh 14 - Maya Cocoa
24	Malpighiales	Salicaceae		<i>Dovyalis caffra</i>	Kei Apple	Africa	Exh. 13 - What is a tree
27	Malpighiales	Euphorbiaceae	N/A	<i>Drypetes diversifolia</i>	Milkbark	South Florida	Exh. 12 - South Florida Native
28	Malpighiales	Euphorbiaceae	N/A	<i>Drypetes lateriflora</i>	Guania plum	South Florida, Bahamas, Greater Antilles, Mexico & Central America	Exh. 12 - South Florida Native
26	Malpighiales	Euphorbiaceae	Euphorbioideae	<i>Euphorbia leucodendron</i>	Stick Plant	Madagascar	Exh. 13 - What is a tree
101	Malpighiales	Salicaceae	Salicoideae	<i>Flacourtia indica</i>	Governor's Plum	Africa, temperate Asia	Exh. 9 - Basal Angiosperms
102	Malpighiales	Salicaceae	Salicoideae	<i>Flacourtia indica</i>	Governor's plum	Africa & Tropical and temperate Asia	Exh. 7 - Bignoniaceae
28	Malpighiales	Malpighiaceae	Byrsominoideae	<i>Galphimia gracilis</i>	Thrysalis, Spray of Gold	Eastern Mexico	Exh 14 - Maya Cocoa
103	Malpighiales	Clusiaceae	Clusioidae	<i>Garcinia livingstonei</i>	African Mangosteen, imbé	Sudan, tropical E Africa to southern Africa	Exh. 7 - Bignoniaceae
40	Malpighiales	Euphorbiaceae	Euphorbioideae	<i>Gymnanthes lucida (=Ateramnus)</i>	Crabwood	South Florida Hammocks	Exh. 12 - South Florida Native
34	Malpighiales	Euphorbiaceae	Crotonoideae	<i>Jatropha curcus</i>	Barbados Nut, Purging Nut, Physic Nut	Mexico and Central America	Exh. 13 - What is a tree
107	Malpighiales	Chrysobalanaceae	N/A	<i>Licania rigida</i>	Oiticica Oil Tree	Brazil	Exh. 5 - Ericales
38	Malpighiales	Ochnaceae	Ochnoideae	<i>Ochna serulata</i>	Mickey Mouse Bush	South Africa	Exh. 13 - What is a tree
106	Malpighiales	Salicaceae	Salicoideae	<i>Oncoba spinosa</i>	Fried Egg Tree	East Africa	Exh. 6 - Fabaceae
105	Malpighiales	Phyllanthaceae	Phyllanthaeae	<i>Phyllanthus acidus</i>	Otaheite gooseberry	Madagascar?	Exh. 4 - Moraceae
43	Malpighiales	Phyllanthaceae	N/A	<i>Phyllanthus arbuscula</i>	N/A	Endemic to Jamaica	Exh. 13 - What is a tree
106	Malpighiales	Phyllanthaceae	Phyllanthaeae	<i>Phyllanthus emblica</i>	Indian gooseberry	Southern India?	Exh. 4 - Moraceae

Non-Representative Species Planted in the Euphorbiaceae and other Malpighiales Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	G.A. Exhibit in which Non-Ericales Species Belong, if any
100	Zygophyllales	Zygophyllaceae	Larreoideae	<i>Bulnesia arborea</i>	Verawood	Columbia and Venezuela	N/A
101	Gentianales	Apocynaceae	Rauvolfioideae	<i>Cameraria latifolia</i>	White Poisonwood, Palo de Leche	Southern Mexico, Guatemala, Belize, and Caribbean	Exh.14 - Maya Cocoa
102	Fabales	Fabaceae	Caesalpinioideae	<i>Cassia alata (=Senna alata)</i>	Candlebush	Mexico	Exh. 6 - Fabaceae, Exh.14 - Maya Cocoa
103	Polypodiales	Polypodiaceae	N/A	<i>Platyceium bifurcatum</i>	Staghorn Fern	Australia	N/A
104	Sapindales	Meliaceae	Swietenioideae	<i>Swietenia mahagoni</i>	Caribbean Mahogany	South Florida and Caribbean	Exh. 10 - Sapindales, Exh. 12 - South Florida Natives
105	Gentianales	Rubiaceae	Ixoroideae	<i>Vangueria infausta</i>	Wild Medlar	South Africa	N/A

Exhibit 3 - Gymnosperms

The first vascular plants are estimated to have arisen 420 million years ago, and the first plants with leaves occurred approximately 400 million years ago (ferns and horsetails). The earliest plants with seeds then occurred between 300 and 360 million years ago. Seeds were a very significant evolutionary step in the plant world. In angiosperms and the Gnetales group of Gymnosperms, seeds also constituted the pairing of new plant embryos with a food store and a protective coating called “testa”. In effect, this evolution constituted a process of “double fertilization” whereby one part of the gamete forms the embryo of the new plant, while another part forms a package of food and protection that makes up the rest of a seed.

The earliest of the seed plants were the gymnosperms, which are also known as the “naked seed” plants because the male pollen attaches directly to the female ovule without having to travel down a flower's style and the ovary is not enclosed within a carpel. Three orders of gymnosperms were particularly important trees: the cycads, the ginkgoes, and the conifers. All gymnosperms are woody and are slow to reproduce. A year may pass between pollination and fertilization, and seed maturation may require another three years and sometimes external stimuli like fire before they will sprout.

The oldest of the gymnosperm orders is the Cycadales or cycads. This order is divided into the Cycadaceae and Zamiaceae families. Although sometimes superficially appearing like palms, cycads evolved before the dinosaurs and many millions of years before palms. Today, there are only about 130 known species of cycads, and all of them are dioecious, meaning that individual plants are either male or female. But their reproductive mechanism is very different from that of flowers. Instead, cycads produce cone like structures called strobili, and the pollinated strobili of female plants produce seeds while the strobili of males contain only pollen. Unlike many gymnosperms, cycads depend primarily on insects (usually beetles) to effect pollination rather than wind.

In the Arboretum, we have 3 *Dioon* species of cycads. These cycads are native to Mexico, and *Dioon Spindulosum* is one of the tallest and most tree-like of all the cycads. One can also see *Encephalartos ferox*, a large cycad from Africa that likes shade, and “cardboard palm” (*Zamia furfuracea*), another cycad that originated in Mexico. We also have Florida's (and North America's) only native cycad, coontie (*Zamia integrifolia*) growing in Exhibit 12 –the South Florida Natives. This cycad is unusual in that, with proper preparation, it is edible. Early people like the Calusa, and later the Seminoles and early European settlers, made starch from the roots and stems of this plant.

The most economically important group of trees within the gymnosperms is the Coniferales, or conifers. Some scientists believe that conifers arose as early as 300 million years ago. While the timing of their beginnings may be debated, it is certain that the conifers were the most prevalent trees on Earth for millions of years and that this dominance lasted until as recently as 50 million years ago. The first angiosperms (trees with flowers) occurred about 145 million years ago and, during the last 100 million years, they have gradually out-competed and displaced the conifers as earth's dominant trees. Although still a very important group of trees both ecologically and economically, the conifers today generally flourish only in areas where

flowering plants find it especially difficult to survive, which generally means areas that experience very low temperatures. Tropical conifers generally survive only in isolated pockets, and there are no conifers today that are native to the Amazon region or central Africa.

Interestingly, conifers can thrive in areas of very poor soil quality, and this makes them an important pioneer species (species that repopulate disturbed areas) in many parts of the world. One reason for their ability to thrive in poor soils is the important symbiotic relation that conifers have with a soil fungus called mycorrhiza. These specialized fungi invade the roots of a tree or trees, and are then fed by the trees in exchange for the fungi extending the trees' abilities to absorb water, minerals and other nutrients from the soil.

There are 8 families of conifers, and they include 70 genera and approximately 630 species (in contrast, it is estimated that today there are more than 300,000 species of angiosperms!). The largest and most economically important of these families is the Pinaceae, which contains only 11 genera, but 225 species. Most of these species tend to be temperate plants and the most important of the genera are *Pinus* (the pines), *Abies* (the firs), *Picea* (the spruces), *Larix* (the larches), and *Tsuga* (the hemlocks). The only species within the Pinaceae family that is native to southern Florida is *Pinus ellottii* var. *densa*, which was once a dominant tree species in this area. However, the vast stands of our area's native pines have now been reduced to remnant patches, primarily as the result of habitat loss to development. *Pinus ellottii* var. *densa* can be seen growing on other parts of the campus and in the vacant lot across Campo Santo from the Arboretum. In the Arboretum, we grow *Cedrus deodara* as an example of a Pinaceae species. It is native to the lower elevations of the western Himalayas.

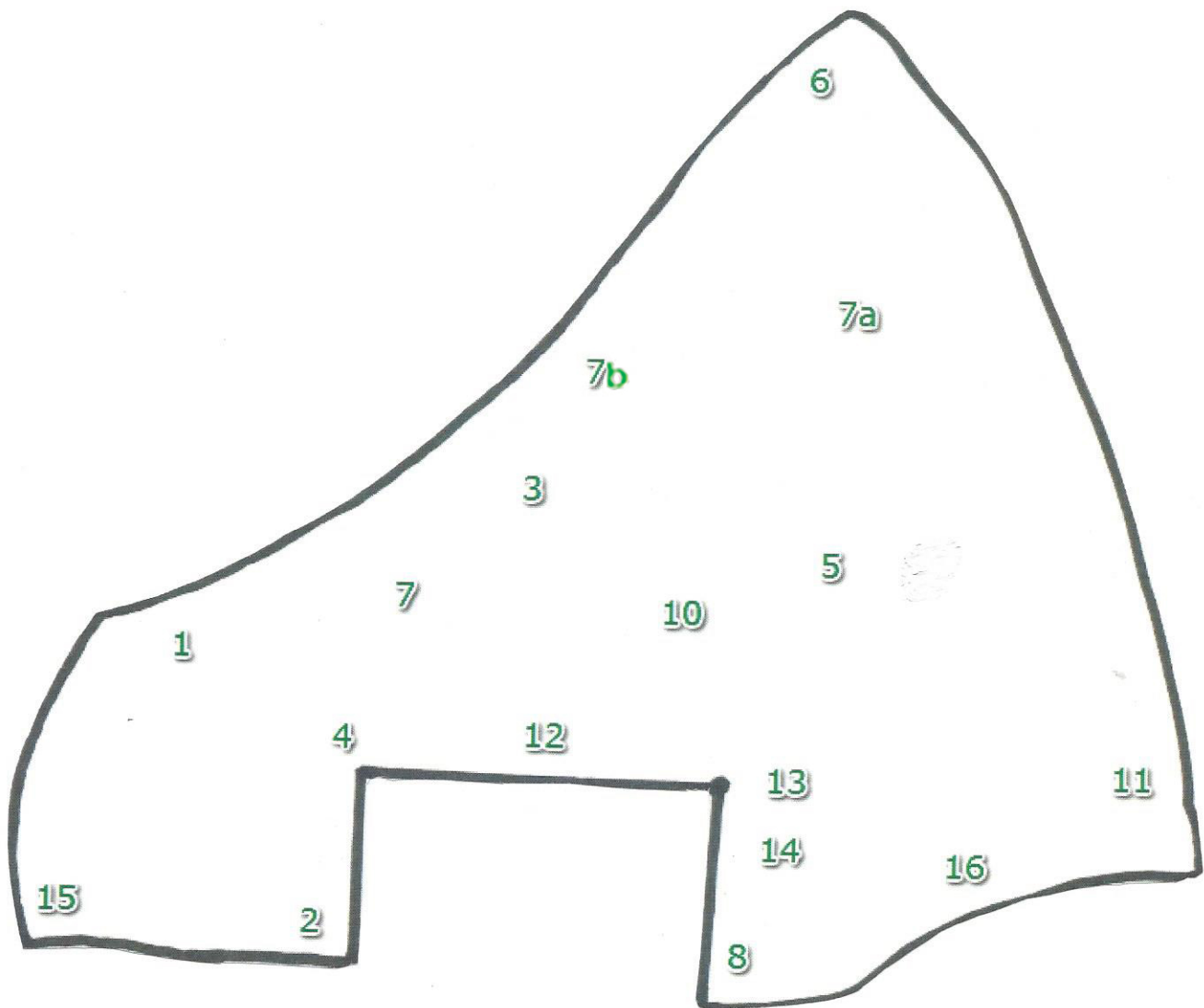
After the Pinaceae, the second largest family of conifers is the Podocarpaceae, with 18 genera and 185 species. These are found mainly in the southern hemisphere and many of the species are indigenous to the island of New Caledonia. Evolving during the times of the supercontinent Gondwana, *Podocarpus* is the namesake and largest genus in this family. With approximately 105 species distributed primarily throughout the southern hemisphere, only a few are found naturally north of the equator. One of those, *Podocarpus macrophyllus*, is from China and Japan and we are lucky to have a male and female pair in the Arboretum that produces an edible cone on the female plant that resembles a berry during the fall. Another species represented in the Gymnosperms Exhibit is yellowwood (*Podocarpus henkelii*) from South Africa. It is an attractive ornamental tree with slender, drooping leaves.

Although much smaller in numbers, the tropical conifers are a fascinating group and the Araucariaceae family is arguably the most interesting. This family is believed to have lived throughout the world during the time of the dinosaurs (approximately 200 million years ago), but today it consists of only 3 genera containing a total of 41 species. These include *Agathis robusta* from Queensland, Australia. It is a very large tree with thick leaves that have no midrib. With straight trunks and good timber quality, they were heavily logged by European settlers and few of the biggest specimens survive today. The Arboretum also contains *Agathis vitiensis* and 4 species of *Araucaria*. *Araucaria bidwillii* (False Monkey Puzzle) has particularly sharp and tough leaves that one can imagine were an evolutionary development to discourage dinosaurs from dining on them.

Another important family of the conifers is the Cupressaceae, with 30 genera and approximately 133 species. This family includes the cypresses, junipers, and redwoods, including the world's largest tree (*Sequoiadendron giganteum*) and the world's tallest tree (*Sequoia sempervirens*), both of which are indigenous to California. In the Gymnosperms Exhibit, one can see Chinese plum yew (*Cunninghamia lanceolata*) and oriental arborvitae (*Thuja orientalis*) as examples of this family.

Finally, we are very fortunate to have one of the Gnetales in our Arboretum. *Gnetum gnemon* is a slender, evergreen tree native to southern Asia. It is dioecious and the strobilus consists of a slender spike bearing pollen in males and ovules in females. Fertilized ovules produce large seeds surrounded by a fleshy red covering. The seeds are cooked and eaten, and the young leaves and strobili are also eaten as vegetables. Some have argued that the Gnetales were the origin of the angiosperms, but this theory is generally rejected today.

Exhibit 3 – Gymnosperms



1. *Afrocarpus gracilior*
2. *Agathis robustus*
3. *Agathis vitiensis*
4. *Araucaria bidwillii*
5. *Araucaria biramulata*
6. *Araucaria cunninghamii*
var. *glauca*
7. *Araucaria montana*

- 7a. *Cedrus deodara*
- 7b. *Chamaecyparis thyoides*
8. *Cunninghamia lanceolata*
10. *Dacrydium balansae*
11. *Gnetum gnemon*
12. *Podocarpus henkelii*

13. *Podocarpus macrophyllus*
var. *maki*
14. *Podocarpus macrophyllus*
var. *maki*
15. *Taxus mairei*
16. *Thuja orientalis*
(=*Platyclusus orientalis*)

Gymnosperms

Exhibit 3 - Color Code =

Representative Species in Gymnosperm Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin
1	Pinales	Podocarpaceae	N/A	<i>Afrocarpus gracilior</i>	Fern Pine	Ethiopia, Kenya, Uganda and Tanzania
2	Pinales	Araucariaceae	N/A	<i>Agathis robustus</i>	Queensland Kauri	Eastern Queensland, Australia
3	Pinales	Araucariaceae	N/A	<i>Agathis vitiensis</i>	Pacific Kauri	Fiji
4	Pinales	Araucariaceae	N/A	<i>Araucaria bidwillii</i>	Bunya Pine, False Monkey Puzzle	Queensland, Australia
5	Pinales	Araucariaceae	N/A	<i>Araucaria biramulata</i>	Biramule Araucaria	New Caledonia
6	Pinales	Araucariaceae	N/A	<i>Araucaria cunninghamii</i> var. <i>glauca</i>	Hoop Pine	Eastern tropical Australia
7	Pinales	Araucariaceae	N/A	<i>Araucaria montana</i>	N/A	New Caledonia
7a	Pinales	Pinaceae	Abietoideae	<i>Cedrus deodara</i>	Deodar Cedar	Lower elevations of western Himalayas
7b	Pinales	Cupressaceae	Cupressoideae	<i>Chamaecyparis thuyoides</i>	Atlantic White Cedar	Atlantic coast from Maine to Georgia, Florida Gulf coast
8	Pinales	Cupressaceae	Cunninghamioidae	<i>Cunninghamia lanceolata</i>	Shan Mu, China fir	Taiwan, China, SE Asia: Laos, Vietnam
10	Pinales	Podocarpaceae	N/A	<i>Dacrydium balansae</i>	N/A	New Caledonia
11	Gnetales	Gnetaceae	N/A	<i>Gnetum gnemon</i>	Melinjo	India, Southeast Asia and southwest Pacific"
12	Pinales	Podocarpaceae	N/A	<i>Podocarpus henkelii</i>	Henkel's Yellowwood	South Africa
13, 14	Pinales	Podocarpaceae	N/A	<i>Podocarpus macrophyllus</i> var. <i>maki</i>	Shrubby Yew, Buddhist Pine	China, Japan
15	Pinales	Taxaceae	N/A	<i>Taxus mairei</i>	Maire's Yew	China, Taiwan
16	Pinales	Cupressaceae	Cupressoideae	<i>Thuja orientalis</i> (= <i>Platyclusus orientalis</i>)	Oriental Arborvitae	North China, Korea

Gymnosperm Species in Other Gifford Arboretum Exhibits

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	Location
102	Cycadales	Zamiaceae	Encephalartoideae	<i>Strongylodon macrobotrys</i>	Palma de la Virgen	Eastern coast of Mexico	Exh. 4 - Moraceae and other Rosales
103	Cycadales	Zamiaceae	Encephalartoideae	<i>Dioon mejiae</i>	Palma Tiocente, Sacred Ear	Honduras and Nicaragua	Exh. 4 - Moraceae and other Rosales
104	Cycadales	Zamiaceae	Encephalartoideae	<i>Dioon spinulosum</i>	Giant Dioon	Mexico	Exh. 4 - Moraceae and other Rosales
25	Cycadales	Zamiaceae	Encephalartoideae	<i>Encephalartos ferox</i>	Tongaland Broodboom	Southern-east coast of Africa	Exh. 13 - What is a tree
73	Pinales	Cupressaceae	Taxodioidae	<i>Taxodium distichum</i> (= <i>T. ascendens</i>)	Bald Cypress, Pond Cypress	Wetlands, SE US	Exh. 12 - South Florida Natives
112	Cycadales	Zamiaceae	Zamiodeae	<i>Zamia furfuracea</i>	Cardboard Palm	Eastern Mexico	Exh. 1 - Arecaceae
74	Cycladales	Zamiaceae	Zamiodeae	<i>Zamia integrifolia</i> (= <i>Zamia pumila</i>)	Coontie, Florida Arrowroot	Southern Florida, West Indies and Cuba	Exh. 12 - South Florida Natives
109	Cycadales	Zamiaceae	Zamiodeae	<i>Zamia vazquezii</i>	Amigo del Maize	Endemic to Veracruz State, Mexico	Exh. 4 - Moraceae and other Rosales
110	Cycadales	Zamiaceae	Zamiodeae	<i>Zamia vazquezii</i>	Amigo del Maize	Endemic to Veracruz State, Mexico	Exh. 4 - Moraceae and other Rosales

Exhibit 4 - Moraceae and Other Rosales

The Moraceae family consists of about 40 genera and 1,000 species. It has been undergoing taxonomic revisions in recent years and, with a few exceptions, it is further divided into tribes rather than having subfamilies.

Spread predominantly throughout the tropics and subtropics, some Moraceae members are also in temperate areas, like many species in the mulberry group. Nearly all species in this family contain a milky sap, and leaves are usually simple and grow in an alternate arrangement. The “flowers” of these species are actually comprised of many flowers in the form of a compressed inflorescence. This family includes many edible species such as *Artocarpus atilis* (bread fruit), *Artocarpus heterophyllus* (jak fruit), *Morus rubra* (mulberry) and some *Ficus sp.* (fig).

Ficus altissima (Council Tree) is a well-known member of Moraceae that is found in this Exhibit as well as gracing the swales of Old Cutler Road here in Coral Gables. It is a massive, spreading tree with large, thick leaves, dense canopy and smooth bark. Although it has an original trunk that started from seed, this species later produces aerial roots that can create additional trunks or stems when they hit the ground and take root. Although sometimes referred to as “banyan trees,” there is one species that is the true or original banyan and that is *Ficus benghalensis*, which is sometimes called “Giant Banyan” or “Indian Banyan.” It is indeed the largest tree in terms of canopy coverage, with individual specimens in India covering over 200,000 square feet. However, many members of the *Ficus* genus that have aerial roots are now referred to as “banyans” and this is a good example of why it is beneficial to know botanical names. Common names can be, and often are, shared by multiple species and that leads to confusion at best, or worse, total miscommunication.

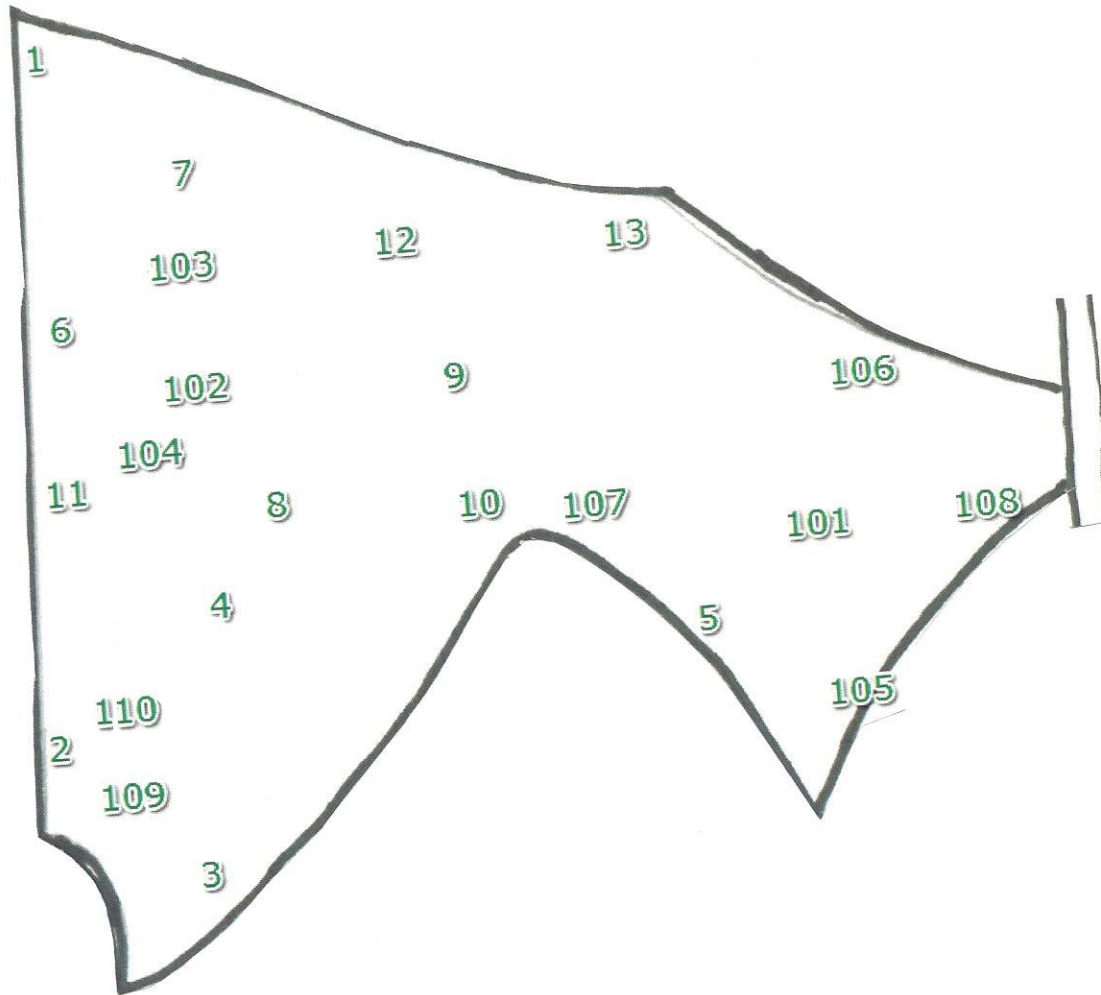
In addition to *F. altissima*, the Gifford Arboretum contains six other species of *Ficus*. Included in the five others in this Exhibit area are *F. sycamorus.*, commonly known as the sycamore fig or the fig-mulberry, and it is native to Africa. Similar to most *Ficus* species, this species becomes a large tree in suitable habitat. In its native countries, almost all parts of this tree were historically put to use, and many of these uses are carried on today. The mature fruits are eaten and can also be used to prepare an alcoholic beverage. The leaves are used as fodder for animals. The wood is used as fuel and the ashes of the wood as a salt substitute. Many parts of the tree such as the bark, leaves, and the milky latex are used for medicinal purposes.

Another *Ficus* species found in this Exhibit is *F. carica*. Although all *Ficus* species bear fruit that are called “figs,” and many of them are edible, *F. carica* is one of the species whose figs are commonly eaten by man. Although the fruit of this species are larger, juicier, and sweeter than many other figs, all figs share the characteristic of containing many small seeds that are the result of the unusual, genus wide characteristic of bearing tiny flowers inside a hollow inflorescence. They are pollinated by tiny wasps, and many *Ficus* species have at least traditionally only been fertilized by one specific wasp species that evolved in a species specific symbiotic relation.

Florida has 2 native *Ficus* species. *F. aurea*, or strangler fig, is a common large tree that usually begins life in the crotch of another tree (thanks to bird dispersion) and then sends root down to the ground, eventually killing its host by literally a “slow strangulation.” *F. citrifolia* or shortleaf fig is less common and not as big as *F. aurea*, but both species benefit many birds in many ways. Except for volunteers from time to time, the Arboretum does not contain *F. aurea*, but *F. citrifolia* is growing in Exhibit 14 – The Maya Cocoa Garden.

In addition to other members of the Moraceae, the Gifford Arboretum contains species of other families within the Rosales order. Those include species representing the Roseaceae, Urticaceae, Rhamnaceae and Ulmaceae families.

**Exhibit 4 – Moraceae and
Other Rosales**



- 1 *Artocarpus atilis*
- 2 *Artocarpus hypargyrea*
- 3, 4 *Cecropia palmata*
- 5 *Eriobotrya japonica*
- 6 *Ficus altissima*
- 7 *Ficus aspera*
- 8 *Ficus carica*.

- 9 *Ficus destruens*
- * 10 *Ficus elastica*
- 11 *Ficus sycomorus*
- 12 *Pourouma sp.*
- * 13 *Rosa chinensis*
- Non-Rosales
- 101 *Blighia sapida*

- 102 *Dioon edule*
- 103 *Dioon mejiae*
- 104 *Dioon spinulosum*
- 105 *Phyllanthus acidus*
- 106 *Phyllanthus emblica*
- 107 *Ixora finlaysonia*
- 108 *Ixora odorata*
- 109, 110 *Zamia vazquezii*

The Moraceae and other Rosales Exhibit

Exhibit 4 - Color Code

Representative Species in the Moraceae and other Rosales Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin
1	Rosales	Moraceae	N/A	<i>Artocarpus atilis</i>	Breadfruit (Variety Ma'afala)	Malay Peninsula & S Pacific Islands
2	Rosales	Moraceae	N/A	<i>Artocarpus hypargyrea</i>	Kwai Muk	South China
3, 4	Rosales	Urticaceae	N/A	<i>Cecropia palmata</i>	Cecropia	Tropics of Central and South America
5	Rosales	Rosaceae	Amygdaloideae	<i>Eriobotrya japonica</i>	Loquat, Japanese Plum	China
6	Rosales	Moraceae	N/A	<i>Ficus altissima</i>	Council Tree	India, China, Philippines (EPPC II)
7	Rosales	Moraceae	N/A	<i>Ficus aspera</i>	Clown Fig (Variety Parcellii)	Only in cultivation; wild type from South Pacific Islands.
8	Rosales	Moraceae	N/A	<i>Ficus carica</i>	Common Fig	Mediterranean
9	Rosales	Moraceae	N/A	<i>Ficus destruens ex. Queensland</i>	Rusty fig, Boonjie Fig	Australia: Queensland
10	Rosales	Moraceae	N/A	<i>Ficus elastica</i>	India Rubber tree "Tricolor"	Only in cultivation; wild type from South East Asia
11	Rosales	Moraceae	N/A	<i>Ficus sycamorus</i>	Sycamore Fig	Central Africa
12	Rosales	Urticaceae	N/A	<i>Pourouma sp.</i>		Tropics of Central and South America
13	Rosales	Rosaceae	Rosoideae	<i>Rosa chinensis mutabilis</i>	China rose, Butterfly rose	Southwest China

Moraceae and other Rosales Species in Other Gifford Arboretum Exhibits

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	
9	Rosales	Moraceae	N/A	<i>Brosimum alicastrum</i>	Mayan breadnut, Chak óox, Ramón, Capomo	Tropical America	Exh. 14 - Maya Cocoa
21	Rosales	Ulmaceae/Cannabaceae	N/A	<i>Celtis laevigata</i>	Hackberry	North America	Exh. 12 - South Florida Natives
25	Rosales	Rhamnaceae	N/A	<i>Colubrina elliptica (= C. reclinata)</i>	Soldierwood	Florida, Caribbean, Central America	Exh. 12 - South Florida Natives
102	Ericales	Ebenaceae	Ebenoideae	<i>Diospyros digyna</i>	Black Sapote	Eastern Mexico and Central America	Exh. 6 - Fabaceae
27	Rosales	Moraceae	Ficeae	<i>Ficus citrifolia</i>	Shortleaf Fig	Mexico, Belize, Guatemala to Panama; Native-South Florida, West Indies	Exh. 14 - Maya Cocoa
104	Rosales	Ulmaceae	In Dispute	<i>Holoptelea integrifolia</i>	Indian Elm	India	Exh. 11 - Malvaceae
43b	Ericales	Primulaceae	Theophrastoideae	<i>Jacquinia keyensis</i>	Joewood	Florida and the Caribbean	Exh. 12 - South Florida Natives
43a	Rosales	Rhamnaceae	N/A	<i>Krugiodendron ferreum</i>	Black Ironwood	South Florida, Caribbean, Mexico	Exh. 12 - South Florida Natives
45a, 45b	Rosales	Moraceae	N/A	<i>Morus rubra</i>	Red Mulberry	Eastern US	Exh. 12 - South Florida Natives
55	Rosales	Rosaceae	Amygdaloideae	<i>Prunus myrtifolia</i>	West Indian Cherry	South Florida, Mexico, West Indies to Brazil	Exh. 12 - South Florida Natives
101	Rosales	Rosaceae	Rosoideae	<i>Rubus niveus</i>	Mysore raspberry	Southern Asia, Taiwan and Philippines	Exh. 12 - South Florida Natives
109	Rosales	Rhamnaceae	N/A	<i>Zizyphus mauritiana</i>	Indian Jujube	Southeastern Asia	Exh. 7 - Bignoniaceae

Non-Representative Species Planted in the Moraceae and other Rosales Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	
101	Sapindales	Sapindaceae	Sapindoideae	<i>Blighia sapida</i>	Akee	West Africa	Exh 10: Sapindales
102	Cycadales	Zamiaceae	Encephalartoideae	<i>Dioon edule</i>	Palma de la Virgen, Chestnut Dioon	Endemic to coastal Eastern Mexico	Exh. 3. Gynosperrms
103	Cycadales	Zamiaceae	Encephalartoideae	<i>Dioon mejiae</i>	Palma teosinte (Sacred Ear)	Honduras and Nicaragua	Exh. 3. Gynosperrms
104	Cycadales	Zamiaceae	Encephalartoideae	<i>Dioon spinulosum</i>	Giant Dioon	Endemic to tropical rainforests of Veracruz and Oaxaca, Mexico.	Exh. 3. Gynosperrms
105	Malpighiales	Phyllanthaceae	Phyllanthaeae	<i>Phyllanthus acidus</i>	Otaheite gooseberry	Madagascar?	Exh 2: Euphorbiaceae & Malpighiale
106	Malpighiales	Phyllanthaceae	Phyllanthaeae	<i>Phyllanthus emblica</i>	Indian gooseberry	Southern India?	Exh 2: Euphorbiaceae & Malpighiale
107	Gentianales	Rubiaceae	Ixoroidaeae	<i>Ixora finlaysonia</i>	Siamese White Ixora	Thailand	NA
108	Gentianales	Rubiaceae	Ixoroidaeae	<i>Ixora odorata</i>	Fragrant Ixora	SE Asia, Pacific islands	NA
109	Cycadales	Zamiaceae	Zamiodeae	<i>Zamia vazquezii</i>	Amigo del Maize	Endemic to Veracruz State, Mexico	Exh. 3. Gynosperrms
110	Cycadales	Zamiaceae	Zamiodeae	<i>Zamia vazquezii</i>	Amigo del Maize	Endemic to Veracruz State, Mexico	Exh. 3. Gynosperrms

Exhibit 5 - Sapotaceae and other Ericales

The Sapotaceae family belongs to the Ericales order, which in turn is part of the asterids, a large group of eudicots that are named for the Asteraceae or daisy family. The Sapotaceae family consists of at least 53 genera that contain as many as 1,500 species, most of which are tropical.

Most Sapotaceae species contain a milky sap, and some are characterized by reddish brown hairs on the undersides of their leaves. There are quite a few members of this family in the Gifford Arboretum, including the sapodilla (*Manilkara zapota*), which is also known as nispero or chickle in its native areas of Mexico and Central America. It was a favorite fruit of the Mayans and a specimen can be seen growing in the Maya Cocoa Garden Exhibit. Its sticky white sap was the inspiration for early gum that was called “chickle” in its native region and that name continues today as a brand name for certain commercially produced gum.

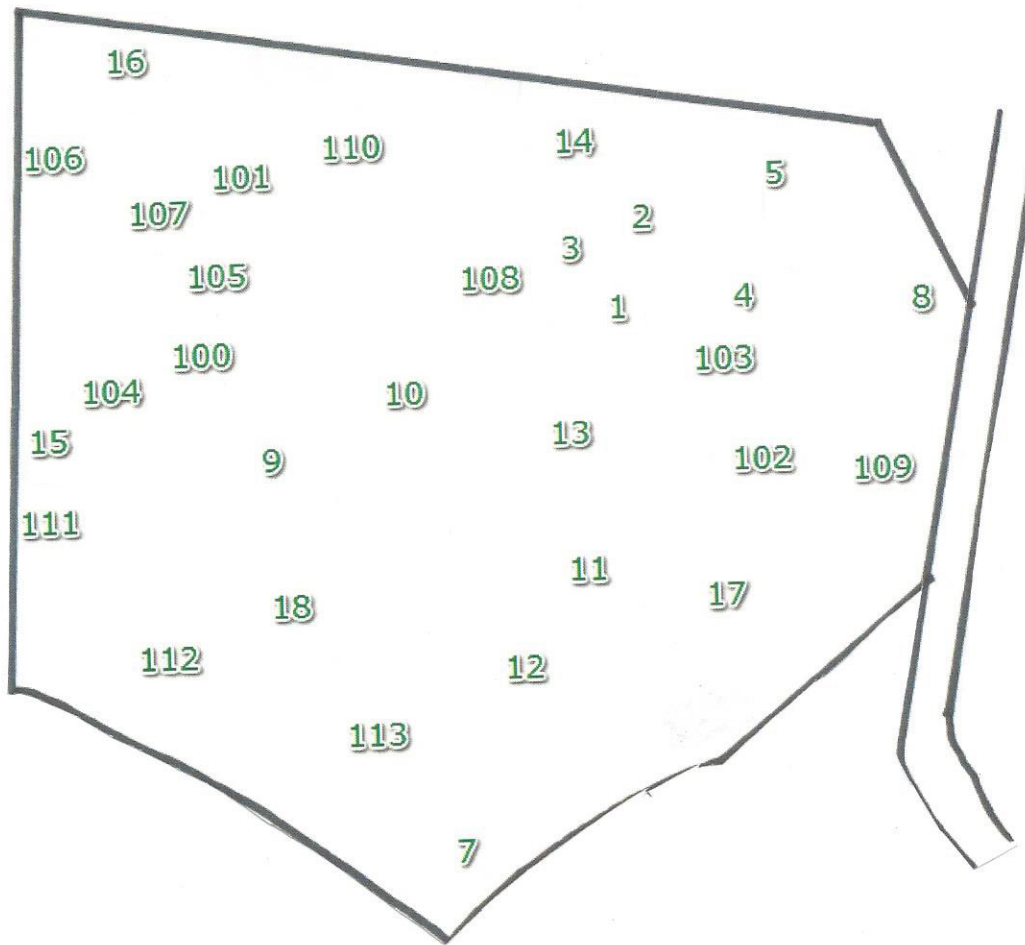
Other members of the Sapoteaceae family that can be seen in the Gifford Arboretum include canistel or eggfruit (*Pouteria campechiana*) and caimito or star apple (*Chrysophyllum cainito*), both of which have edible fruits. One of this family’s most interesting members is miracle fruit (*Synsepalum dulciferum*). Its red, berry-like fruit derives its common name from the fact that it contains a chemical called miraculin that blocks the mouth’s sour receptors and causes sour foods to taste sweet when they are consumed shortly after a miracle fruit. It will make one think that you are eating a sweet orange when you are biting into a lemon or lime!

Some native plants in the South Florida Natives Exhibit are also members of the Sapotaceae family and one can observe satinleaf (*Chrysophyllum oliviforme*), mastic (*Sideroxylon foetidissimum*), and willow bastic (*Sideroxylon salicifolium*) in the Arboretum.

Other families and species of the Ericales order growing in the Arboretum include black sapote (*Diospyros digyna*), which is part of the Ebenaceae family. This tree is native to Mexico and Central America, and the pulp of its fruit turns dark brown and has the texture of chocolate pudding when it is ripe. Besides being eaten fresh, its pulp can be used to make delicious ice cream, breads, and cakes. Many *Diospyros* species are valued for their dark, rich wood called “ebony” which is valued not only for its beauty, but also for its heaviness and strength.

Other members of the Ericales order growing in the Arboretum include the cannonball tree (*Courupita guianensis*), *Gustavia superba*, and freshwater mangrove (*Barringtonia racemose*), all of which are members of the Lecythidaceae family and are grown primarily for their showy flowers. The cannonball tree gets its name from the fact that it produces its exotic, sweet-smelling flowers and large, wooden fruits on stalks emanating directly from the trunk (a phenomenon called “cauliflory” within the science of botany). Besides resembling cannonballs, these fruits can allegedly sound like cannons being fired when they hit one another when blown by very strong winds! In its native areas of the new world tropics, the pulp of the fruits is used as fodder for pigs and poultry.

**Exhibit 5 – Sapotaceae
and Other Ericales**



- | | | |
|-----------------------------------|------------------------------------|-----------------------------------|
| 1 <i>Ardisia elliptica</i> | 13 <i>Gustavia superba</i> | 104 <i>Gardenia thumbergia</i> |
| 2 <i>Ardisia escallonioides</i> | 14 <i>Jacquinia pungens</i> | 105 <i>Khaya senegalensis</i> |
| 3 <i>Ardisia obovata</i> | 15 <i>Lecythis pisonis</i> | 106 <i>Koanophyllon villosum</i> |
| 4 <i>Ardisia revolute</i> | 16 <i>Napoleonaea imperialis</i> | 107 <i>Licania rigida</i> |
| 5 <i>Ardisia sieboldii</i> | 17 <i>Synsepalum dulcificum</i> | 108 <i>Noronhia emarginata</i> |
| 7 <i>Barringtonia racemosa</i> | 18 <i>Theophrasta jussieu</i> | 109 <i>Parmentiera cereifera</i> |
| * 8 <i>Chrysophyllum cainito</i> | <u>Non-Ericales</u> | 110 <i>Portlandia grandiflora</i> |
| 9 <i>Clavija domingensis</i> | 100 <i>Aphanamixis polystachya</i> | * 111 <i>Randia formosa</i> |
| 10 <i>Couroupita guianensis</i> | 101 <i>Cedrela odorata</i> | 112 <i>Spondias mombin</i> |
| 11, 12 <i>Diospyros lycioides</i> | 102 <i>Ceiba speciosa</i> | 113 <i>Spondias purpurea</i> |
| | 103 <i>Crescentia cujete</i> | |

Sapotaceae & Other Ericales

Exhibit 5 - Color Code

Representative Species in the Sapotaceae and other Ericales Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin
1	Ericales	Primulaceae	Myrsinoideae	<i>Ardisia elliptica</i>	Shoebuttan Ardisia	India, Sri Lanka, Malaysia, Indonesia and New Guinea
2	Ericales	Primulaceae	Myrsinoideae	<i>Ardisia escallonioides</i>	Marlberry	Florida, Mexico, Guatemala, Belize, and Caribbean
3	Ericales	Primulaceae	Myrsinoideae	<i>Ardisia obovata</i>	Mameyuela, Guadeloupe Marlberry	Puerto Rico, West Indies
4	Ericales	Primulaceae	Myrsinoideae	<i>Ardisia revoluta</i>	Tucuco	Central America
5	Ericales	Primulaceae	Myrsinoideae	<i>Ardisia sieboldii</i>	Duo Zhi Zi Jin Niu	Japan
7	Ericales	Lecythidaceae	Planchonioideae	<i>Barringtonia racemosa</i>	Putat Kampung, Freshwater mangrove	Philippines
8	Ericales	Sapotaceae	Chrysophylloideae	<i>Chrysophyllum cainito</i>	Caimito, Cainito, Star Apple	West Indies
9	Ericales	Primulaceae	Theophrastoideae	<i>Clavija domingensis</i>	Langue de boeuf	Endemic to Dominican Republic
10	Ericales	Lecythidaceae	Lecythidoideae	<i>Couropita guianensis</i>	Cannonball tree	Central and South America
11,12	Ericales	Ebenaceae	Ebenoideae	<i>Diospyros lycioides</i>	Bushveld Bluebush	Southern Africa
13	Ericales	Lecythidaceae	Lecythidoideae	<i>Gustavia superba</i>	Membrilla, Sachamango, Heaven Lotus	Central and Northwest South America
14	Ericales	Primulaceae	Theophrastoideae	<i>Jacquinia pungens</i>	Barbasco, needlebush	S Mexico
15	Ericales	Lecythidaceae	Lecythidoideae	<i>Lecythis pisonis</i>	Monkey Pot, Paradise Nut	Brazil, Amazon
16	Ericales	Napoleonaceae	N/A	<i>Napoleonaea imperialis (= Napoleonaea imperialis)</i>	Naepolean's Hat	Nigeria
17	Ericales	Sapotaceae	Chrysophylloideae	<i>Synsepalum dulcificum</i>	Miracle Fruit	West Africa
18	Ericales	Primulaceae	Theophrastoideae	<i>Theophrasta jussieu</i>		Endemic to Haiti and Dominican Republic

Sapotaceae and other Ericales Species in Other Gifford Arboretum Exhibits

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	Location
6	Ericales	Myrsinaceae	Myrsinoideae	<i>Ardisia escallonioides</i>	Marlberry	South Florida	Exh. 12 - South Florida Natives
7	Ericales	Primulaceae	Myrsinoideae	<i>Ardisia revoluta</i>	Tucuco	Mexico, Central America	Exh. 14 - Maya Cocoa
11	Ericales	Sapotaceae	Chysophylloideae	<i>Bumelia celastrina (a/k/a Sideroxylon celastrinum)</i>	Saffron Plum	Florida, Texas, Central and South America	Exh. 12 - South Florida Natives
22	Ericales	Sapotaceae	Chysophylloideae	<i>Chrysophyllum oliviforme</i>	Satinleaf	Florida, Caribbean	Exh. 12 - South Florida Natives
103	Rosales	Rhamnaceae	N/A	<i>Hovenia dulcis</i>	Oriental rasiin tree	Asia	Exh. 6 - Fabaceae
35	Ericales	Sapotaceae	Sapotoideae	<i>Manilkara zapota</i>	Sapodilla, Nispero, Ya'		Exh. 14 - Maya Cocoa
106	Ericales	Sapotaceae	Sapotoideae	<i>Mimusops elengi</i>	Bakula, Elengli	India to Malaysia	Exh. 7 - Bignoniaceae
107	Ericales	Sapotaceae	Chysophylloideae	<i>Pouteria campechiana</i>	Eggfruit, Canistel	Mexico to Panama	Exh. 7 - Bignoniaceae
68	Ericales	Sapotaceae	Chysophylloideae	<i>Sideroxylon foetidissimum</i>	False Mastic	Florida, Caribbean, northern Central America, Mexico	Exh. 12 - South Florida Natives
68a	Ericales	Sapotaceae	Chysophylloideae	<i>Sideroxylon salicifolium</i>	Willow-Bustic	South Florida, Mexico, Central America and Caribbean	Exh. 12 - South Florida Natives

Non-Representative Species Planted in the Sapotaceae and other Ericales Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	G.A. Exhibit in which Non-Ericales Species Belong, if any
100	Sapindales	Meliaceae	Melioideae	<i>Aphanamixis polystachya</i>	Pithraj	S. China to New Guinea, India, Sri Lanka	Exh. 10 - Sapindales
101	Sapindales	Meliaceae	Melioideae	<i>Cedrela odorata</i>	Cigarbox Cedar, Spanish Cedar, Cedro hembra	West Indies	Exh. 10 - Sapindales
102	Malvales	Malvaceae	Bombacoideae	<i>Ceiba speciosa (= Chorisia speciosa)</i>	Pink Floss Silk Tree	Eastern Brazil to Bolivia, Peru	Exh. 11 - Malvales
103	Lamiales	Bignoniaceae	Crescentieae	<i>Crescentia cujete</i>	Calabash, Higuera	Mexico to Colombia, West Indies	Exh. 7 - Bignoniaceae, Exh.14 - Maya Cocoa
104	Gentianales	Rubiaceae	Ixoroideae	<i>Gardenia thumbergia</i>	Forest Gardenia, Wild Gardenia	Endemic to the Southern and Eastern regions of South Africa	N/A
105	Sapindales	Meliaceae	Melioideae	<i>Khaya senegalensis</i>	African mahogany, Gambia mahogany,	Western Tropical Africa and Uganda	Exh. 10 - Sapindales
106	Asterales	Asteraceae	Asteroideae	<i>Koanophyllon villosum</i>	Florida Shrub Thoroughwort, Shrub Eupatorium	Florida, West Indies	Exh. 12 - South Florida Natives
107	Malpighiales	Chrysobalanaceae	N/A	<i>Licania rigida</i>	Oiticica Oil Tree	Brazil	Exh. 2 - Malpighiale
108	Lamiales	Oleaceae	N/A	<i>Noranhia emarginata</i>	Madagascar Olive	Madagascar	N/A
109	Lamiales	Bignoniaceae	N/A	<i>Parmentiera cereifera</i>	Candle Tree	Endemic to Panama	Exh. 7 - Bignoniaceae
110	Gentianales	Rubiaceae	Ixoroideae	<i>Portlandia grandiflora</i>	Bellflower	Jamaica	N/A
111	Gentianales	Rubiaceae	Ixoroideae	<i>Randia formosa</i>	Blackberry Jam	Neotropics	N/A
112	Sapindales	Anacardiaceae	Spondioidaeae	<i>Spondias mombin</i>	Yellow Mombin, Spanish Plum	Tropical Americas	Exh. 10 - Sapindales, Exh. 14 - Maya Cocoa
113	Sapindales	Anacardiaceae	Spondioidaeae	<i>Spondias purpurea</i>	Purple Mombin, Hog Plum, Jocote	Tropical Americas	Exh. 10 - Sapindales, Exh. 14 - Maya Cocoa

Exhibit 6 - Fabaceae

This family can justifiably be called the “Fabulous Fabaceae” since it contains some of the world's most spectacular flowering trees. However, many members of the Fabaceae (or Legume) family also have the important attribute of having symbiotic relations with certain soil-borne bacteria that “fix nitrogen” in the soil which, in turn, helps provide nutrients to the host and other plants. This significantly reduces the need for fertilizers containing nitrogen, and the concomitant potential for water pollution. Madre de Cacao (*Gliricidia sepium*) with its lovely pink flowers has long been used to great advantage in the cultivation of chocolate (*Theobroma cacao*) going back to the days of the Mayans, and with the modern world's problems with pollution caused by nitrogen fertilizers, the expanded use of nitrogen-fixing legumes in our agricultural practices should be seriously considered and pursued. We already incorporate some of the benefits of nitrogen fixing plants when we rotate crops with plantings of clover. White clover (*Trifolium repens*) and red clover (*Trifolium pratense*) are Fabaceae species that not only provide nutritious fodder for cows and other grazing animals, but they also reduces the need for synthetic fertilizers by fixing nitrogen.

Now grown throughout the tropics, probably the most ubiquitous member of the Fabaceae is the Royal Poinciana (*Delonix regia*). This Madagascar native is arguably the most spectacular flowering tree in the world, and its incredible bloom displays are celebrated each year in Miami with a festival sponsored by the Tropical Flowering Tree Society in early June. While the most common color of its flowers is bright orange, they can range from deep reddish-orange to bright yellow, and every shade in between! In the Arboretum, you can see both *Delonix regia* as well as *Delonix elata*, a smaller tree with flowers that open white and turns yellow within a day, and that also features long, red stamens. It is from east continental Africa and has the distinction of being the only *Delonix* species that does not originate from Madagascar. We also have *Delonix pumila* in the What is a Tree? Exhibit. It is known as Dwarf Flamboyant, but our specimen has not bloomed to date and very little reliable information is available about this rare species.

Cassia is a genus that contains many very beautiful flowering trees. In the Arboretum, we have *Cassia bakeriana*, a fairly new introduction to southern Florida that comes from Thailand and Myanmar. It produces lovely pink flowers in early spring, which can mean as early as February in our area. It is a prolific bloomer and also starts blooming when only a few years old.

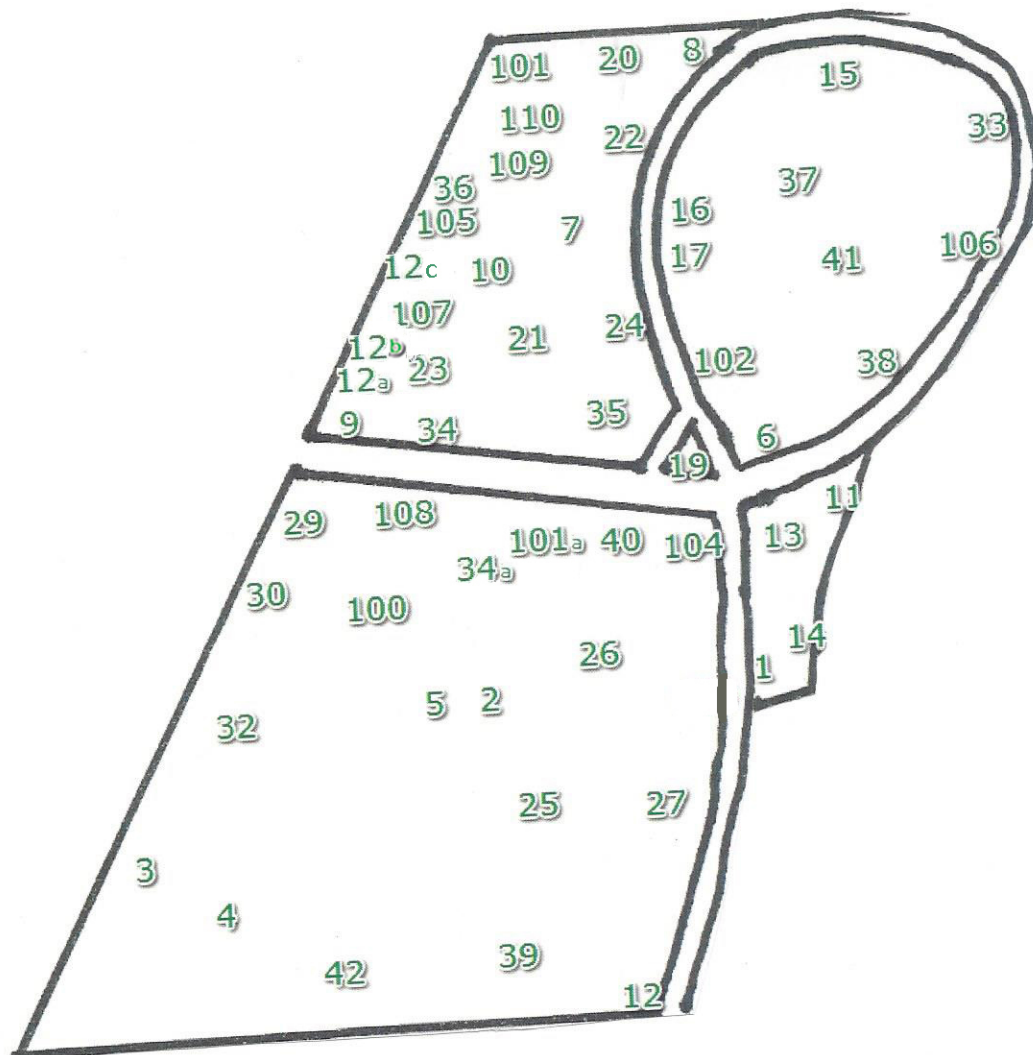
Another species with exceptionally beautiful flowers is Golden Shower (*Cassia fistula*), which produces hanging racemes of yellow flowers that are very striking when abundant. In Asia, the pulp around the seeds of *C. fistula* has been used as a laxative, and the bark has been used to treat skin infections.

In the Arboretum, one can also see species of *Brownea*, *Bauhinia*, *Erythrina*, *Acacia*, *Saraca* and other genera, each with its own special blooms. One of our most striking Fabaceae species is Flame of the Forest (*Butea monosperma*) so named for the intense display of bright orange flowers resembling parrot beaks that cover the canopy in early spring. It has religious significance for both Hindus and Buddhists, and has medicinal uses in some of its native areas in India and southeastern Asia.

Finally, we have a good selection of Fabaceae species of African origin, including African Blackwood (*Dalbergia melanoxylon*), a species valued for its timber and, in particular, for its black heartwood that has great tonal qualities and is the traditional wood preferred for high-end clarinets, oboes and bassoons.

In the Fabaceae Exhibit, we also feature two non-Fabaceae species that are members of the Proteaceae family. Both are endemic to Queensland, Australia, and these ancient species arose during the mid Cretaceous, when Australia, Antarctica and South America were joined. Fire Tree (*Alloxylon wickhamii*) is a tall, columnar tree that produces masses of small, deep red flowers when it blooms, and Firewheel (*Stenocarpus sinuatus*) produces umbels of red flowers that resemble a small wheel with spokes. Both species produces large, oak like leaves when young but, as they mature, the leaves become simple and with an elliptical shape.

Exhibit 6 – Fabaceae



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|--|-------------------------------------|---|
| 1 <i>Acacia nilotica</i> a/k/a <i>Vachellia nilotica</i> | 19 <i>Chloroleucon tortum</i> | 37 <i>Saraca cauliflora</i> |
| 2 <i>Acacia sphaerocephala</i> a/k/a <i>Vachellia sphaerocephala</i> | 20 <i>Colophospermum mopane</i> | 38 <i>Saraca indica</i> |
| 3 <i>Bauhinia galpinii</i> | 21 <i>Colvillea racemosa</i> | 39 <i>Schizilobium parahyba</i> |
| 4 <i>Bauhinia monandra</i> | 22 <i>Cynometra portoricensis</i> | 40 <i>Schotia afra</i> |
| 5 <i>Bauhinia rufescens</i> | * 23 <i>Dalbergia melanoxyton</i> | 41 <i>Schotia brachypetala</i> |
| 6 <i>Bolusanthus speciosus</i> | 24 <i>Delonix elata</i> | * 42 <i>Sophora secundiflora</i> |
| 7 <i>Brownea coccinea</i> subsp. <i>capitella</i> | 25 <i>Erythrina herbacea</i> | <u>Non-Fabaceae</u> |
| 8 <i>Brownea grandiceps</i> | 26 <i>Erythrina livingstonia</i> | 100 <i>Alloxylon wickhamii</i> |
| 9 <i>Brownea macrophylla</i> | 27 <i>Erythrina speciosa</i> | 101 <i>Crossandra infundibuliformis</i> |
| * 10 <i>Browneopsis</i> sp. | 29 <i>Intsia bijuga</i> | 101a <i>Deplanchia tetraphylla</i> |
| 11 <i>Brya ebenus</i> | 30 <i>Lysiloma sabicu</i> | 102 <i>Diospyros digyna</i> |
| 12 <i>Butea monosperma</i> | 32 <i>Lysiphyllum hookeri</i> | 104 <i>Kopsia arborea</i> |
| 12 a, b, c <i>Caesalpenia pulcherrima</i> | 33 <i>Maniltoa lenticellata</i> | * 105 <i>Nashia inaguensis</i> |
| 13 <i>Calliandra haematocephala</i> | 34 <i>Mimosa pudica</i> | 106 <i>Oncoba spinosa</i> |
| 14 <i>Cassia afro fistula</i> | 34a <i>Mondulea sericea</i> | 107 <i>Sabal palmetto</i> |
| 15 <i>Cassia bakeriana</i> | 35 <i>Philenoptera violacea</i> | 108 <i>Stenocarpus sinuatus</i> |
| 16, 17 <i>Cassia fistula</i> | 36 <i>Pithecellobium flexicaule</i> | 109, 110 <i>Triplaris cumingiana</i> |

The Fabaceae Exhibit
Exhibit 6 - Color Code=

Representative Species in the Fabaceae Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin
1	Fabales	Fabaceae	Mimosoideae	<i>Acacia nilotica</i> a/k/a <i>Vachellia nilotica</i>	Scented Thorn Acacia	E Africa
2	Fabales	Fabaceae	Mimosoideae	<i>Acacia sphaerocephala</i> a/k/a <i>Vachellia sphaerocephala</i>	Bull Thorn Acacia	Endemic to Mexico
3	Fabales	Fabaceae	Caesalpinioideae	<i>Bauhinia gpalinii</i>	Pod Mahogany	Eastern Africa
4	Fabales	Fabaceae	Caesalpinioideae	<i>Bauhinia monandra</i>	Pride of De Kaap, Red Bauhinia	Endemic to eastern and southern Africa
5	Fabales	Fabaceae	Caesalpinioideae	<i>Bauhinia rufescens</i>	Orchid Tree	SE Asia
6	Fabales	Fabaceae	Faboideae	<i>Bolusanthus speciosus</i>	Tree Wisteria, Mogaba	Sahel and other semi-arid parts of Africa
7	Fabales	Fabaceae	Caesalpinioideae	<i>Brownea coccinea capitella</i>	Rose of Venezuela, Scarlet Flame	Brazil, Venezuela, Caribbean
8	Fabales	Fabaceae	Caesalpinioideae	<i>Brownea grandiceps</i>	Rose of Venezuela	Northern South America
9	Fabales	Fabaceae	Caesalpinioideae	<i>Brownea macrophylla</i>	Mountain Rose	South America and Central America
10	Fabales	Fabaceae	Caesalpinioideae	<i>Browneopsis</i> sp.	Panama Flame	North and West South America
11	Fabales	Fabaceae	Faboideae	<i>Brya ebenus</i>	Jamaican rain tree, Cocuswood	West Indies
12	Fabales	Fabaceae	Faboideae	<i>Butea monosperma</i>	Flame-of-the-Forest, Palash	India, Sri Lanka, Myanmar, Malayan Peninsula
12a	Fabales	Fabaceae	Caesalpinioideae	<i>Caesalpinia pulcherrima</i>	Price of Barbados, Peacock Flower	Unknown (probably West Indies)
12b	Fabales	Fabaceae	Caesalpinioideae	<i>Caesalpinia pulcherrima</i>	Price of Barbados, Peacock Flower	Unknown (probably West Indies)
12c	Fabales	Fabaceae	Caesalpinioideae	<i>Caesalpinia pulcherrima</i>	Price of Barbados, Peacock Flower	Unknown (probably West Indies)
13	Fabales	Fabaceae	Mimosoideae	<i>Calliandra haematocephala</i>	Red powderpuff	Bolivia
14	Fabales	Fabaceae	Caesalpinioideae	<i>Cassia afrodistula</i>	Kenya Shower	E Africa
15	Fabales	Fabaceae	Caesalpinioideae	<i>Cassia bakeriana</i>	Dwarf Apple Blossom Shower, Pink Shower	Tropical Asia
16, 17	Fabales	Fabaceae	Caesalpinioideae	<i>Cassia fistula</i>	Golden Shower Tree	SE Asia, widely distributed
18	Fabales	Fabaceae	Caesalpinioideae	<i>Ceratonia siliqua</i>	Carob, St. John's bread, Algarrobo	Mediterranean coast & islands
19	Fabales	Fabaceae	Mimosoideae	<i>Chloroleucon tortum</i> (= <i>Pithecellobium tortum</i>)	Brazilian raintree, Tataré, Jurema	Brazil: restinga forest
20	Fabales	Fabaceae	Caesalpinioideae	<i>Colophospermum mopane</i>	Mopane, Mopani	South Africa, Zimbabwe, Mozambique, Botswana, Zambia
21	Fabales	Fabaceae	Caesalpinioideae	<i>Colvillea racemosa</i>	Colville's Glory	Endemic to Madagascar
22	Fabales	Fabaceae	Caesalpinioideae	<i>Cynometra Parrotcensis</i>	Oreganillo Falso	Endemic to Puerto Rico
23	Fabales	Fabaceae	Faboideae	<i>Dalbergia melanoxylon</i>	African Blackwood	Eastern Africa
24	Fabales	Fabaceae	Caesalpinioideae	<i>Delonix elata</i>	Tiger Bean	Eastern Africa
25	Fabales	Fabaceae	Faboideae	<i>Erythrina herbagea</i>	Coral Bean, Cherokee Bean	South Florida, southern US, Mexico
26	Fabales	Fabaceae	Faboideae	<i>Erythrina livingstonia</i>	Natal Coral Tree	South Africa
27	Fabales	Fabaceae	Faboideae	<i>Erythrina speciosa</i>	Coral Bean	Brazil
29	Fabales	Fabaceae	Caesalpinioideae	<i>Intsia bijuga</i>	Vesi, Merbau, Borneo Teak, Moluccan Ironwood	Madagascar, SE Asia, Pacific Islands
30, 31	Fabales	Fabaceae	Mimosoideae	<i>Lysiloma sibiicu</i>	Sabicu, Horseflesh Mahogany	West Indies, Cuba, Yucatan
32	Fabales	Fabaceae	Caesalpinioideae	<i>Lysiphylum hookeri</i> f/k/a <i>Bauhinia hookeri</i>	White Bauhinia, Pegunny, Mountain Ebony	North Eastern Australia
33	Fabales	Fabaceae	Caesalpinioideae	<i>Manittoa lenticulata</i>	Silk Handkerchief Tree	New Guinea
34	Fabales	Fabaceae	Mimosoideae	<i>Mimosa pudica</i>	Sensitive Plant, Morir-vivir	Brazil
34a	Fabales	Fabaceae	Faboideae	<i>Mondulea sericea</i>	African Cork Bush	Southern Africa
35	Fabales	Fabaceae	Faboideae	<i>Philenoptera violacea</i>	Apple Leaf, Rain Tree,	Central and Southern Africa
36	Fabales	Fabaceae	Mimosoideae	<i>Pithecellobium flexicaule</i> a/k/a <i>Ebenopsis ebano</i>	Texas Ebony, Ebony blackbead, Ebano	Texas- Mexico: Yucatan
37	Fabales	Fabaceae	Caesalpinioideae	<i>Saraca cauliflora</i> (= <i>S. thiapiensis</i>)	Yellow Saraca	India, SE Asia
38	Fabales	Fabaceae	Caesalpinioideae	<i>Saraca indica</i>	Ashoka	India, SE Asia
39	Fabales	Fabaceae	Caesalpinioideae	<i>Schizolobium parahyba</i>	Tower Tree, Brazilian Fern Tree	Tropical America
40	Fabales	Fabaceae	Caesalpinioideae	<i>Schotia afra</i>	Karoo Boer-bean	Africa
41	Fabales	Fabaceae	Caesalpinioideae	<i>Schotia brachypetala</i>	Huilboerboon	Southern parts of Africa
42	Fabales	Fabaceae	Caesalpinioideae	<i>Sophora secundiflora</i> a/k/a <i>Dermatophyllum secundiflorum</i>	Mountain Laurel, Mescal Bean	Southwestern United States

Fabaceae Species in Other Gifford Arboretum Exhibits

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	Location
1	Fabales	Fabaceae	Mimosoideae	<i>Acacia farnesiana</i>	Sweet Acacia	South Florida	Exh. 12 - South Florida Natives
100	Fabales	Fabaceae	Mimosoideae	<i>Albizia niopoides</i> var <i>niopoides</i>	Tantakayo Albizia	Central and South America	Exh. 1 - Arecaceae
100	Fabales	Fabaceae	Caesalpinioideae	<i>Caesalpinia pulcherrima</i>	Pride of Barbados, Peacock Flower	Unknown (probably West Indies)	Exh. 9 - Basal Angiosperms
102	Fabales	Fabaceae	Caesalpinioideae	<i>Cassia alata</i> (= <i>Senna alata</i>)	Candlebush	Mexico	Exh. 2 - Malpighiales
23	Fabales	Fabaceae	Caesalpinioideae	<i>Delonix pumila</i>	Dwarf Flamboyant	Madagascar endemic	Exh. 13 - What is a Tree
108	Fabales	Fabaceae	Caesalpinioideae	<i>Delonix regia</i>	Poinciana	Madagascar	Exh. 10 - Sapindales
101	Fabales	Fabaceae	Mimosoideae	<i>Dichrostachys cinerea</i>	Princess' earrings, sickle bush	West, East, and Southern Africa: savannah	Exh. 8 - Myrtales
101	Fabales	Fabaceae	Mimosoideae	<i>Enterolobium cyclocarpum</i>	Guanacaste, Ear-pod tree, parota, huanacaxtle	Central America, Mexico to Colombia	Exh. 1 - Arecaceae
29	Fabales	Fabaceae	Faboideae	<i>Gilircidia sepium</i>	Madrede Cacao	Mexico and Central America	Exh. 14 - Maya Cocoa
31	Fabales	Fabaceae	Caesalpinioideae	<i>Haematoxylum campechianum</i>	Logwood, bloodwoodtree, spiny tree, uitzquauit, huitzcuahuitl	Mexico: Yucatan; Belize, Honduras	Exh. 14 - Maya Cocoa
32	Fabales	Fabaceae	Mimosoideae	<i>Inga edulis</i>	Ice cream bean	Central and South America	Exh. 14 - Maya Cocoa
106	Fabales	Fabaceae	Mimosoideae	<i>Leucaena esculanta</i>	Esculent Leadtree, Guaje	Mexican highlands	Exh. 1 - Arecaceae
107	Fabales	Fabaceae	Papilionoideae	<i>Lanchoarpus violaceus</i>	Lancepod, West Indian Lilac	West Indies and northern South America	Exh. 1 - Arecaceae
21a	Fabales	Fabaceae	Caesalpinioideae	<i>Chamaecrista deeringiana</i>	Deering Partridge Pea	Southeastern United States	Exh. 12 - South Florida Natives
51	Fabales	Fabaceae	Faboideae	<i>Piscidia piscipula</i>	Jamaica Dogwood	South Florida, WI, Belize, Guatemala	Exh. 12 - South Florida Natives
54	Fabales	Fabaceae	Mimosoideae	<i>Pithecellobium keyense</i>	Florida Keys Blackbead	South FL, FL Keys, Cuba, Mexico	Exh. 12 - South Florida Natives
44	Fabales	Fabaceae	Mimosoideae	<i>Pithecellobium</i> sp.	Blackbeads	Mexico, Central America and northern South America	Exh. 14 - Maya Cocoa
106	Fabales	Fabaceae	Caesalpinioideae	<i>Senna didymobotrya</i>	Pocporn Cassia	Tropical Africa	Exh 11 - Malvales
66a	Fabales	Fabaceae	Caesalpinioideae	<i>Senna ligustrina</i>	Privet Senna	South Florida, Central America and Caribbean	Exh. 12 - South Florida Natives
67	Fabales	Fabaceae	Caesalpinioideae	<i>Senna mexicana</i> var. <i>chapmanii</i>	Bahama senna	South Florida, Bahamas & Cuba	Exh. 12 - South Florida Natives
71	Fabales	Fabaceae	Caesalpinioideae	<i>Sophora tomentosa</i>	Necklace Pod	Florida, Caribbean, S. America	Exh. 12 - South Florida Natives
102	Fabales	Fabaceae	Papilionoideae	<i>Stonyloydien macrobotys</i>	Jade Vine	Philippines	Exh. 12 - South Florida Natives
111	Fabales	Fabaceae	Papilionoideae	<i>Tipuana tipu</i>	Pride of Bolivia, Rosewood	Bolivia, Argentina, Brazil	Exh. 1 - Arecaceae

Non-Representative Species Planted in the Fabaceae Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	G.A. Exhibit in which Non-Fabaceae Species Belong, if any
100	Proteales	Proteaceae	Grevilleoideae	<i>Alloxylon wickhamii</i>	Fire Tree	Endemic to Queensland	N/A
101	Lamiales	Acanthaceae	Acanthoideae	<i>Crossandra infundibuliformis</i>	Firecracker flower	Southern India and Sri Lanka	N/A
101a	Lamiales	Bignoniaceae	N/A	<i>Deplanchea tetraphylla</i>	Golden Bouquet Tree	East Australia	Exh. 7 - Bignoniaceae
102	Ericales	Ebenaceae	Ebenoideae	<i>Diospyros digyna</i>	Black Sapote	Eastern Mexico and Central America	Exh. 4 - Ericales, Exh 14 - Maya Cocoa
103	Rosales	Rhamnaceae	N/A	<i>Hovenia dulcis</i>	Oriental rasin tree	Asia	Exh. 5 - Rosales
104	Gentianales	Apocynaceae	Rauvolfioideae	<i>Kopsia arborea (=K. pruniformis)</i>	Purple Marble Tree	South and Southeast Asia, Australia	N/A
105	Lamiales	Verbenaceae	Verbenoideae	<i>Nashia inaequalis</i>	Moujean Tea, Bahamas Berry, Pineapple Verbena	E Caribbean	N/A
106	Malpighiales	Salicaceae	Salicoideae	<i>Oncoba spinosa</i>	Fried Egg Tree	East Africa	Exh. 2 - Malpighiales
107	Arecales	Arecaceae	Coryphoideae	<i>Sabal palmetto</i>	Sabal Palm/Cabbage Palm	Southern United States, Caribbean	Exh. 1 - Arecaceae
108	Proteales	Proteaceae	Grevilleoideae	<i>Stenocarpus sinuatus</i>	Firewheel Tree	NE Australia	N/A
109, 110	Caryophyllales	Polygonaceae	Eriogonoideae	<i>Triplaris cumingiana</i>	Long John, Ant tree, Palo Santo	Central and South America	N/A

Exhibit 7 - Bignoniaceae

The recently expanded Lamiales order contains 24 families and approximately 17,800 species. Nineteen of the families contain mostly herbs, but the Lamiaceae (oregano, mint, Etc.) was expanded to include *Tectona grandis* (teak), a tropical hardwood that has become the predominant wood used in commercially-produced furniture. Another family with important trees in the Lamiales is the Oleaceae, which includes *Olea* (olives) and *Fraxinus* (ashes) genera.

Most of the Lamiales species in the Gifford Arboretum are members of the Bignoniaceae, a predominantly tropical family. Like the Fabaceae, it contains many flowering trees that create some of the world's best displays of natural color. Many of them have trumpet-shaped flowers, which is epitomized by members of the *Tabebuia* genus. Some have what might be called stylized trumpets, like the flowers of *Jacaranda*, while others have more cup-shaped flowers, like species in the *Spathodea*, *Kigelia* and *Fernandoa* genera. Most of these also evolved in areas that have marked wet and dry seasons, making them highly adaptable in southern Florida. Some, like *Spathodea campanulata* (African Tulip) may be too adaptable and, although they not yet caused any serious problems here, they are considered highly invasive in some other areas.

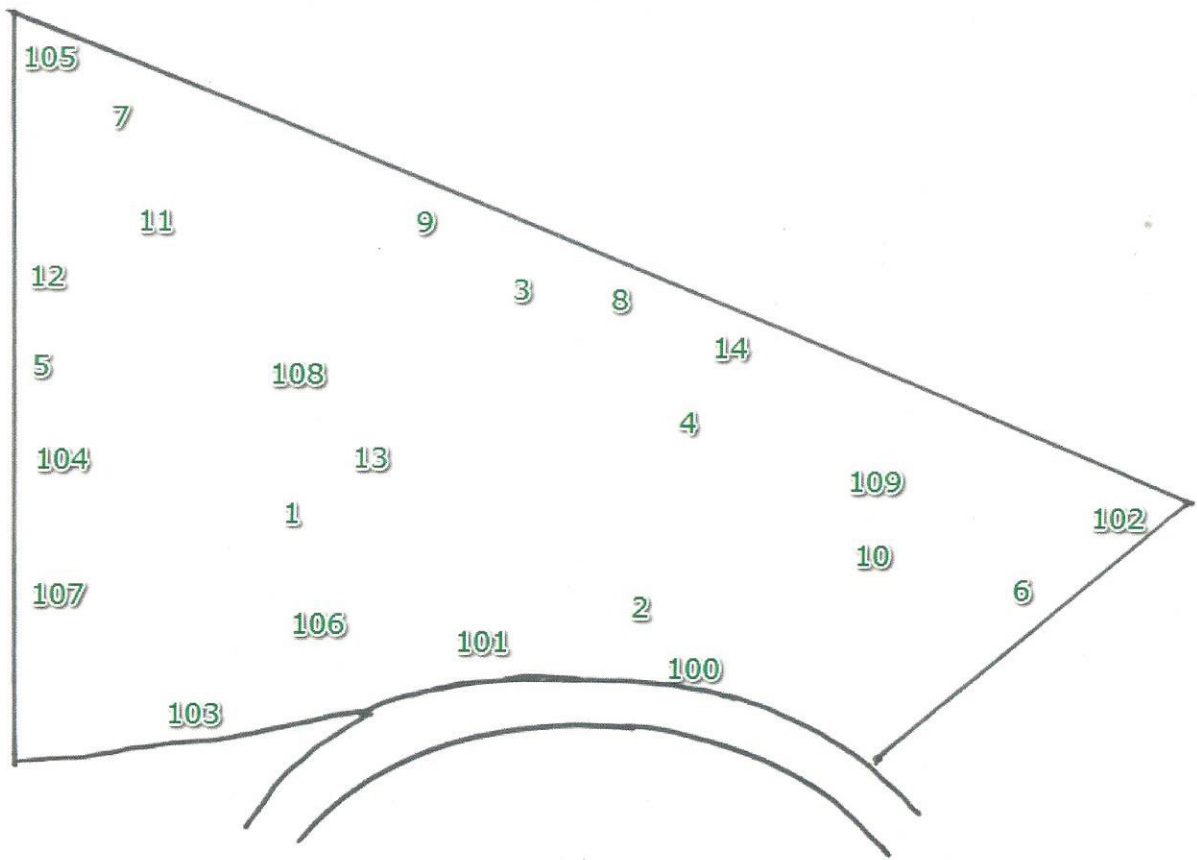
The fruit of many Bignoniaceae are slender or flat capsules that split to release winged seeds that are dispersed by wind. Others, however, like both *Crescentia cujete* (Calabash) and *Amphitecna latifolia* (Black Calabash), produce hard-shelled, gourd-like fruit. These can be hollowed out and used as water vessels, bowls and cups, or carved into masks. Certain Amazon people used carefully placed scale insects on the outside of *Crescentia cujete* fruits to create desired decorative markings or effects that would be later incorporated into masks.

Most Bignoniaceae species have soft wood, but *Markhamia lutea* has durable wood that is pale and finely grained so that it produces a smooth finish. It is also resistant to termites and is used for furniture, window frames, poles, tool handles and boats. *Stereospermum kunthianum* (Pink Jacaranda) has whitish wood with a medium to coarse texture, and it is used for furniture, shelving, tool handles, poles, and utensils. Although soft, the wood of *Spathodea campanulata* (African Tulip Tree) is used for carvings and drums.

Some Bignoniaceae species have potential for medicinal use. *Millingtonia hortensis* (Indian Cork) has oils and extracts that have antifungal properties and are useful for mosquito control as a means of killing larvae. (An inferior cork can also be processed from its furrowed bark.). Various parts of *Oroxylum indicum* are used in traditional medicine for a wide variety of ailments and laboratory research has now identified many pharmacological elements in extracts from this tree, including anti-inflammatory, antifungal, antimicrobial, anti-arthritic, immuno-stimulant, and antioxidant activities.

Although the catalog does not cross reference other Lamiales since this Exhibit is limited to the Bignoniaceae family, other members in this order include the following in Exh. 12 – South Florida Natives: No. 15 (*Callicarpa Americana*), No. 23 (*Citharexylum spinosum*), No. 26 (*Cordia bahamensis*), No. 34 (*Forestiera segregata aka segregate*), and No.36 (*Fraxinus caroliniana*).

Exhibit 7 – Bignoniaceae



- 1 *Amphitecna latifolia*
- 3 *Fernandoa magnifica*
- 4 *Fernandoa* sp.
- 5 *Jacaranda mimosifolia*
- 6 *Kigelia africana*
- 7 *Markhamia lutea*
- 8 *Millingtonia hortensis*.
- 9 *Oroxylum indicum*
- 10 *Radermachara*
sp. "Kunming"
- 11 *Spathodea campanulata*

- 12 *Sterospermum kunthianum* ¹
- 13 *Tabebuia imegitinosa*
- 14 *Tecomaria capensis*

Non-Bignoniaceae

- 100 *Carissa carandas*
- 101 *Carissa grandiflora*
- 102 *Flacourtia indica*
- 103 *Garcinia livingstonei*
- 104 *Graptophyllum pictum*
'Bronze'

- 105 *Homalocladium platycladum*
- 106 *Mimusops elengi*
- 107 *Pouteria campechiana*
- 108 *Vitex* sp.
- 109 *Zizyphus mauritiana*

¹ Status doubtful after hurricane Irma

The Bignoniaceae Exhibit

Exhibit 7 - Color Code =

Representative Species Planted in the Bignoniaceae Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin
1	Lamiales	Bignoniaceae	N/A	<i>Amphitecna latifolia (=Enallagma)</i>	Black Calabash, Jicarillo de la playa	Mexico, Central America, West Indies
3	Lamiales	Bignoniaceae	N/A	<i>Fernandoa magnifica</i>	Snake Tree, African Flame	Eastern Africa
4	Lamiales	Bignoniaceae	N/A	<i>Fernandoa sp.</i>	N/A	Eastern Africa
5	Lamiales	Bignoniaceae	N/A	<i>Jacaranda mimosifolia</i>	Black Poui, Fern tree	Brazil, Argentina
6	Lamiales	Bignoniaceae	N/A	<i>Kigelia africana</i>	Dead Rat Tree	Tropical Africa
7	Lamiales	Bignoniaceae	N/A	<i>Markhamia lutea</i>	Nile Tulip	East Africa
8	Lamiales	Bignoniaceae	N/A	<i>Millingtonia hortensis</i>	Tree jasmine	Myanmar
9	Lamiales	Bignoniaceae	N/A	<i>Oroxylum indicum</i>	Midnight horror	India, Southeast Asia
10	Lamiales	Bignoniaceae	N/A	<i>Radermachara sp. "Kunming"</i>	Kunming	East African Savannah
11	Lamiales	Bignoniaceae	N/A	<i>Spathodea campanulata</i>	African Tulip Tree, Flame-of-the-forest or Nandi Flame	Tropical Africa
12	Lamiales	Bignoniaceae	N/A	<i>Sterospermum kunthianum</i>	Pink Jacaranda	Central Africa
13	Lamiales	Bignoniaceae	N/A	<i>Tabebuia impegtinosa a/k/a Handroanthus impegtinosus</i>	Pink Ipe, Pink Lapacho	Tropical S. America
14	Lamiales	Bignoniaceae	N/A	<i>Tecomaria capensis</i>	Caped Honeysuckle	Southern Africa

Bignoniaceae Species Planted in Other Gifford Arboretum Exhibits

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	Location
103	Lamiales	Bignoniaceae	Crescentieae	<i>Crescentia cujete</i>	Calabash, Higuera	Mexico to Colombia, West Indies	Exh. 5 - Ericales
109	Lamiales	Bignoniaceae	N/A	<i>Parmentiera cereifera</i>	Candle Tree	Endemic to Panama	Exh. 5 - Ericales
101a	Lamiales	Bignoniaceae	N/A	<i>Deplanchea tetraphylla</i>	Golden Bouquet Tree	East Australia	Exh.6 - Fabaceae

Non-Representative Species Planted in the Bignoniaceae Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	G.A. Exhibit in which Non-Bignoniaceae Species Belong, if any
100	Gentianales	Apocynaceae	Rauvolfioideae	<i>Carissa carandas</i>	Karanda	Nepal, Myanmar, Malaysia	N/A
101	Gentianales	Apocynaceae	Rauvolfioideae	<i>Carissa grandiflora</i>	Large Num-num	South Africa	N/A
102	Malpighiales	Salicaceae	Salicoideae	<i>Flacourtia indica</i>	Governer's plum	Africa & Tropical and temperate Asia	Exh. 2 - Malpighiales
103	Malpighiales	Clusiaceae	Clusioidae	<i>Garcinia livingstonei</i>	African Mangosteen, imbé	Sudan, tropical E Africa to southern Africa	Exh. 2 - Malpighiales
104	Lamiales	Acanthaceae	Acanthoideae	<i>Graptophyllum pictum 'Bronze'</i>	Caricature Plant	uncertain; probably New Guinea	N/A
105	Caryophyllales	Polygonaceae	Polygonoideae	<i>Homalocladium platycladum</i>	Ribbon bush	Pacific Islands	N/A
106	Ericales	Sapotaceae	Sapotoideae	<i>Mimusops elengi</i>	Bakula, Elengi	India to Malaysia	Exh. 5 - Ericales
107	Ericales	Sapotaceae	Chrysophylloideae	<i>Pouteria campechiana</i>	Eggfruit, Canistel	Mexico to Panama	Exh. 5 - Ericales, Exh. 14 - Maya Coccoa
108	Lamiales	Lamiaceae	Viticoideae	<i>Vitex sp.</i>	Chaste-tree, Orange Bark Vitex	Mediterranean to Africa to Asia Minor (temperate)	N/A
109	Rosales	Rhamnaceae	N/A	<i>Zizyphus mauritiana</i>	Indian Jujube	Southeastern Asia	Exh. 4 - Rosales

Exhibit 8 - Myrtales

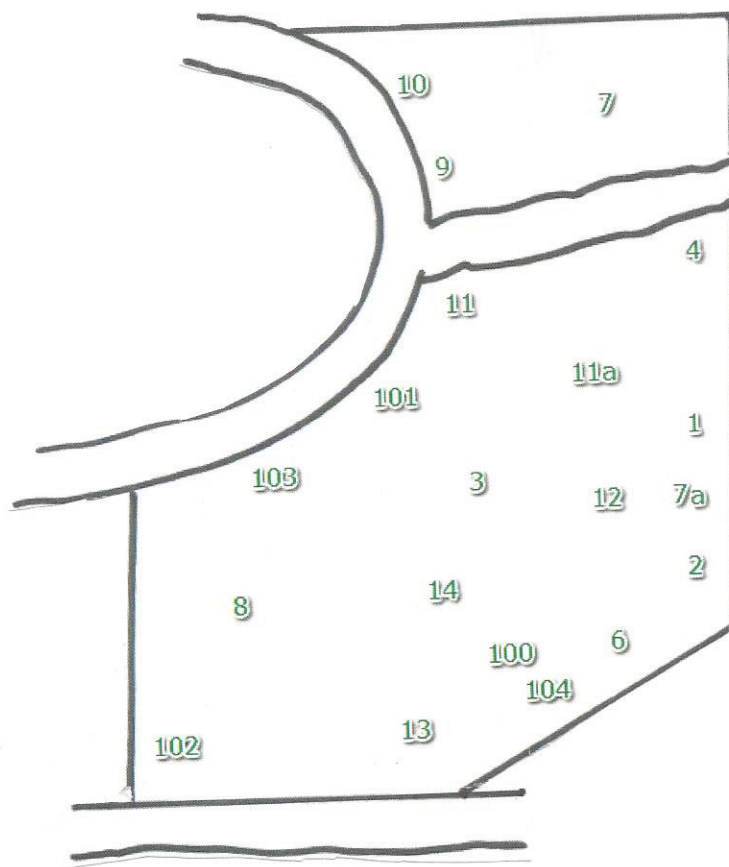
The Rosid clade consists of two main subclades, the Fabids (which include the Fabales, Malpighiales, and Rosales orders) and the Malvids (which includes the Malvales, Sapindales and Brassicales orders). The position of the Myrtales order remains unclear pending further phylogenetic analysis but, as of 2016, the Myrtales order is placed between these large subclades. Some of its families are the Myrtaceae, Lythraceae and Combretaceae.

The namesake Myrtaceae family includes such economically important genera as *Eucalyptus* (timber, oils); *Pimenta* and *Corymbia* (spices, oils and fragrances); and *Eugenia*, *Psidium*, *Syzygium* and *Myrcaria* (fruits). Most members of this family produce flowers with sweet scents that are pollinated by insects, birds or mammals. Some species produce fleshy fruits dispersed by birds and mammals, while others have small or winged seeds that are dispersed by wind or water. Species representing all of these genera can be seen in the Gifford Arboretum, and these include *Eucalyptus deglupta*, one of the most tropical members of the *Eucalyptys* genus and one of the few that is not native to Australia; *Pimenta dioica*, the source of allspice; and *Syzygium malaccense*, which produces the edible Malay apple, but is also a striking flowering tree with masses of small, bright pinkish-purple flower when in bloom. *Myrciaria cauliflora* (jaboticaba) is a small tree from Brazil that produces its flowers and delicious, purple-black round fruit on its trunk and older stems, a botanical adaption called cauliflorous flowering.

Lythraceae is a mostly tropical family that includes many species that prefer aquatic or wet environments. But there are also many dry land species, and some of those are particularly valued for their wood or beautiful flowers. In the Gifford Arboretum, one can see *Lagerstroemia loudonii*, a recently introduced species that is valued for its ornamental flowers and lovely grained wood. One can also see *Punica granatum*, the pomegranate, whose fruit contains numerous seeds with juicy seed coats that have been prized and eaten by man for many centuries.

The Combretaceae family contains trees, shrubs and vines that are pantropical, and include environmentally important, coastal trees like *Laguncularia racemosa* (white mangrove), as well as the *Conocarpus* genus, which includes the buttonwoods. These trees have evolved remarkable abilities to live in or close too salt water. This family also includes another salt tolerant genus, *Bucida*, whose species are sometimes called black olive. We have *Bucida spinossa* growing in the Maya Cocoa Garden Exhibit. In the Myrtales Exhibit, one can see *Combretum constrictum*, a clambering bush that produces masses of showy, reddishorange flowers in the summer and fall. The Myrtales Exhibit also contains *Combretum microphyllum*, a clambering vine that, to my knowledge, has yet to bloom in the Arboretum.

Exhibit 8 – Myrtales



1 *Combretum constrictum*

2 *Combretum fruticosum*

3 *Corymbia citriodora*

4 *Eucalyptus deglupta*

6 *Eugenia brasiliensis*

7 *Eugenia uniflora*

* 7a *Lagerstroemia indica*

8 *Lagerstroemia loudonii*

9 *Lawsonia inermis*

10 *Myrciaria cauliflora*

11 *Pimenta dioica*

11a *Pimenta racemosa*

12 *Punica granatum*

13 *Syzygium malaccense*

14 *Xanthostemon chrysanthus*

Non-Myrtales

100 *Bougainvillea glabra*

101 *Dichrostachys cinerea*

102 *Duranta erecta*

103 *Holmskioldia sanguinea*

104 *Quercus virginiana*

The Myrtales Exhibit
Exhibit 8 - Color Code

Representative Species Planted in the Myrtales Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin
1	Myrtales	Combretaceae	Combretaceae	<i>Combretum constrictum</i>	Thailand Powderpuff	Tropical Africa
2	Myrtales	Combretaceae	NA	<i>Combretum fruticosum</i>	Orange Flame, Monkey Brush	Mexico to N. Argentina
3	Myrtales	Myrtaceae	Myrtoideae	<i>Corymbia citriodora</i>	Lemon Eucalyptus	Temperate and tropical northeastern Australia
4	Myrtales	Myrtaceae	Myrtoideae	<i>Eucalyptus deglupta</i>	Rainbow Eucalyptus	Philippines: Mindanao
6	Myrtales	Myrtaceae	Myrtoideae	<i>Eugenia brasiliensis</i>	Grumichama	Coastal southern Brazil
7	Myrtales	Myrtaceae	Myrtoideae	<i>Eugenia uniflora</i>	Surinam Cherry	East coast of tropical South America
7a	Myrtales	Lythraceae		<i>Lagerstroemia indica</i>	Purple Leaf Crape Myrtle	China, Korea
8	Myrtales	Lythraceae	Lythroideae	<i>Lagerstroemia laudonii</i>	Salao	Thailand and Myanmar
9	Myrtales	Lythraceae	Lythroideae	<i>Lawsonia inermis</i>	Henna	India, Middle East, North Africa
10	Myrtales	Myrtaceae	Myrtoideae	<i>Myrciaria cauliflora</i>	Jaboticaba	Southeast Brazil
11	Myrtales	Myrtaceae	Myrtoideae	<i>Pimenta dioica</i>	Allspice, Ix-nabakuk	Eastern Mexico, Central America, Jamaica
11a	Myrtales	Myrtaceae	Myrtoideae	<i>Pimenta racemosa var. citrifolia</i>	Lemon Scented Bay Rum	Caribbean, Central America
12	Myrtales	Lythraceae	Punicoideae	<i>Punica granatum</i>	Pomegranate, China apple	Iran to N India
13	Myrtales	Myrtaceae	Myrtoideae	<i>Syzygium malaccense</i>	Jambolan	Exact origin obscure, Indomalaysia, India-Burma (EPPC I)
14	Myrtales	Myrtaceae	Myrtoideae	<i>Xanthostemon chrysanthus</i>	Golden Penda, Junjum	Australia: N Queensland

Myrtales Species Planted in Other Gifford Arboretum Exhibits

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	Location
10	Myrtales	Combretaceae	N/A	<i>Bucida spinosa</i>	Júcaro Espinoso, Dwarf black olive, Ming tree	Mexico: Yucatan, West Indies	Exh. 14 - Maya Cocoa
16,17	Myrtales	Myrtaceae	Myrtoideae	<i>Calyptanthus pallens</i>	Spicewood	South Florida, Mexico to Costa Rica, Jamaica	Exh. 12 - South Florida Natives
18	Myrtales	Myrtaceae	Myrtoideae	<i>Calyptanthus zuzugium</i>	Myrtle-of-the-River	South Florida, Tropical America, Caribbean	Exh. 12 - South Florida Natives
29	Myrtales	Myrtaceae	Myrtoideae	<i>Eugenia auxillaris</i>	White Stopper	South Florida	Exh. 12 - South Florida Natives
30a, 30b	Myrtales	Myrtaceae	Myrtoideae	<i>Eugenia confusa</i>	Redberry Stopper	South Florida Hammocks	Exh. 12 - South Florida Natives
31	Myrtales	Myrtaceae	Myrtoideae	<i>Eugenia foetida</i>	Spanish Stopper	South Florida Hammocks, Caribbean	Exh. 12 - South Florida Natives
32	Myrtales	Myrtaceae	Myrtoideae	<i>Eugenia rhombea</i>	Red Stopper	South Florida Hammocks	Exh. 12 - South Florida Natives
45c	Myrtales	Myrtaceae	Myrtoideae	<i>Mosiera longipes</i>	Longstalked Stopper, Mangroveberry	Southern Florida, Caribbean	Exh. 12 - South Florida Natives
46	Myrtales	Myrtaceae	Myrtoideae	<i>Myrcianthes fragrans</i>	Simpson's Stopper	Southern Mexico to Peru, West Indies, South Florida	Exh. 12 - South Florida Natives
37 - 42	Myrtales	Myrtaceae	Myrtoideae	<i>Myrcianthes fragrans</i>	Simpson Stopper	Florida	Exh. 14 - Maya Cocoa
104 - 106	Myrtales	Myrtaceae	Myrtoideae	<i>Psidium cattleianum</i>	Cattley Guava/Strawberry Guava	SE Brazil Atlantic Coast	Exh. 14 - Maya Cocoa
73a	Myrtales	Melastomataceae	N/A	<i>Tetrazygia bicolor</i>	Florida Clover Ash	South Florida, Caribbean	Exh. 12 - South Florida Natives

Non-Representative Species Planted in the Myrtales Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	G.A. Exhibit in which Non-Myrtales Species Belong, if any
100	Caryophyllales	Nyctaginaceae	N/A	<i>Bougainvillea glabra</i>	Bougainvillea, Paper Flower	Brazil	N/A
101	Fabales	Fabaceae	Mimosoideae	<i>Dichrostachys cinerea</i>	Princess' earrings, sickle bush	West, East, and Southern Africa: savannah	Exh. 6 - Fabaceae
102	Lamiales	Verbenaceae	Verbenoideae	<i>Duranta erecta f/k/a Duranta repens</i>	Golden dewdrop, pigeonberry	Native-South Florida, West Indies, Central America to Brazil	Exh. 12 - South Florida Natives
103	Lamiales	Lamiaceae	Scutellarioideae	<i>Holmskioldia sanguinea</i>	Chinese hat	Himalayan lowlands	N/A
104	Fagales	Fagaceae	Quercuoideae	<i>Quercus virginiana</i>	Live Oak	Native- Florida (maybe not extreme southern FL), SE US; Texas	Exh. 12 - South Florida Natives

Exhibit 9 - Basal Angiosperms

Beginning between 200 and 250 million years ago, angiosperms (flowering plants) evolved to become the largest and most diverse group of plants. Flowers improved reproductive ability and seeds evolved to provide a food source for early growth and establishment.

Some of the earliest flowering plants were the basal angiosperms, a group that has a relatively simple flower type and that has continued to today, even as evolution has seen the establishment of more and more complex flowers and organisms.

The largest group of basal angiosperms are the Magnoliids, but basal angiosperms also include water lilies of the order Nymphaeales. The group is characterized by flowers that are generally large and fleshy. Many are highly scented and have repeated structures, especially in the numbers of petals and stamens. Their pollinators were often beetles, attracted to chomp on the luscious flower petals while also spreading pollen as they climbed around the stamen. What appears to be predation was really a survival mechanism!

The Magnoliids include a diverse array of plants that includes bay laurel, cinnamon, avocado and nutmeg. Besides providing us with perfumes and spices, many have secondary compounds that protect them from pests while supplying food for humans and wildlife.

Some of the most interesting basal angiosperms at the Arboretum include:

Annona squamosa (sugar apple)

This tree is commonly grown throughout the tropics for its fruit, which is segmented and has sweet, fragrant flesh. The tree produces many secondary compounds that have led to its use in traditional medicines and as a pesticide. Although the tree is drought tolerant, it is not widely grown in South Florida due to issues with consistent fruit-set and pests.

Cananga odorata (ylang-ylang)

This tree is highly prized for the enchanting scent of its flowers. The essential oils extracted from the yellow-green, starfish shaped flowers are widely used in perfumery and aromatherapy, including the popular perfume from which it derives another common name, the “Chanel No. 5 Tree.”

Cinnamomum zeylanicum (= *Cinnamomum verum*; true cinnamon)

The inner bark of this tree is used to make cinnamon, although certain other species are also used. The cinnamon produced from this species is widely regarded as the best cinnamon, and 80-90% of the world's *C. zeylanicum* cinnamon is grown in Sri Lanka, its native country.

Laurus nobilis (bay laurel)

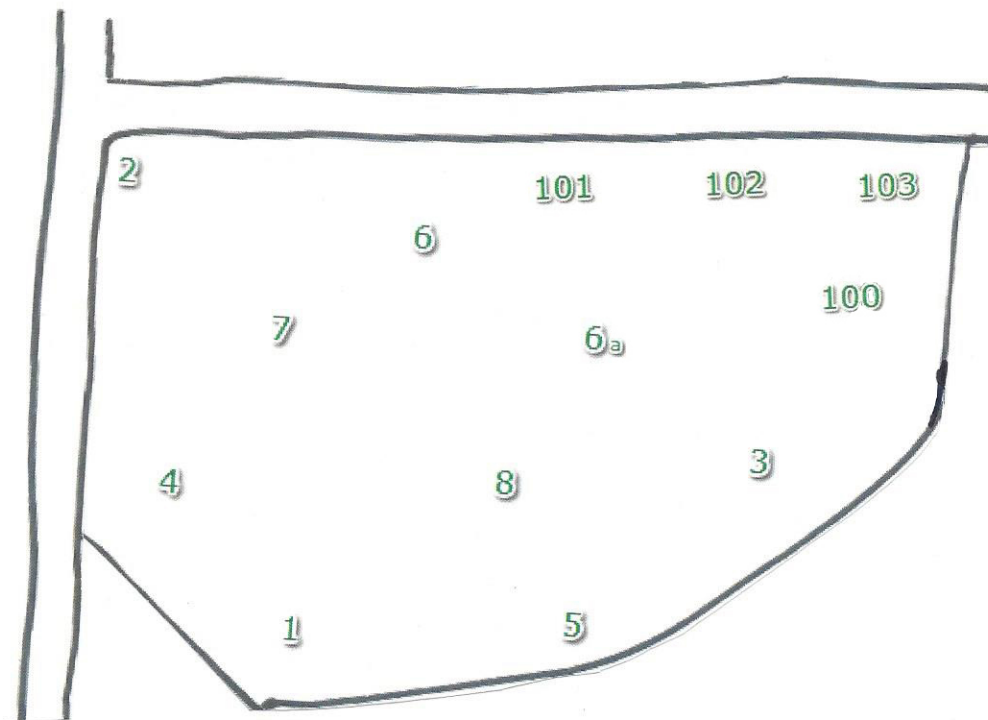
Bay laurel is a member of the Lauraceae family of the Laurales order. It is native to the Mediterranean region where it once formed vast forests. Bay laurel is steeped in history and

cultural significance. In ancient Greece, laurel wreaths were used to symbolize nobility and were one of the symbols of Apollo. Bay laurel has many aromatic compounds, and it is frequently used in Mediterranean cooking, either as whole bay leaves or ground into a powder.

Magnolia champaca

Native to southern Asia, this tree is cultivated for timber and for its highly fragrant flowers. It is commonly used to scent rooms and in garlands, and a common name is “Joy Perfume Tree.” Flowering is most prolific during the summer months.

Exhibit 9 – Basal Angiosperms



1 *Annona squamosa*

2 *Cananga odorata*

3 *Cinnamomum zeylanicum*

4 *Hernandia ovigera*

5 *Laurus nobilis*

6 *Magnolia champaca*

* 6a *Piper nigrum*

7 *Polyalthia suberosa*

8 *Uvaria rufa*

Non-Basal Angiosperms

* 100 *Cordia tauihyensis*

* 101 *Eranthemum pulchellum*

* 102 *Hamelia cuprea*

* 103 *Lepidoploa arbuscula*

Basal Angiosperms

Exhibit 9 - Color Code =

Representative Species Planted in the Basal Angiosperm Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin
1	Magnoliales	Annonaceae	Annonoideae	<i>Annona squamosa</i>	Sugar Apple	Tropical Americas and the West Indies
2	Magnoliales	Annonaceae	Ambaviodeae	<i>Cananga odorata</i>	Ylang Ylang, Chanel No.5 Tree	Philippines, Indonesia
3	Laurales	Lauraceae	Lauroideae	<i>Cinnamomum zeylanicum</i>	True cinnamon	Sri Lanka
4	Laurales	Hernandiaceae	Hernandioidae	<i>Hernandia ovigera</i>	Jack in the Box, Chinese Lantern Tree	East Africa, Southeast Asia
5	Laurales	Lauraceae	Lauroideae	<i>Laurus nobilis</i>	Bay Laurel, Sweet Bay, Laurel	Mediterranean Basin
6	Magnoliales	Magnoliaceae	Magnolioidae	<i>Magnolia champaca</i>	Joy Perfume Tree	South Asia, Southeast Asia
6a	Piperales	Piperaceae	N/A	<i>Piper nigrum</i>	Black Pepper	Southern India
7	Magnoliales	Annonaceae	Malmeoideae	<i>Polyalthia suberosa</i>	Corky-stem Polyalthia	India
8	Magnoliales	Annonaceae	Annonoideae	<i>Uvaria rufa</i>	Caraboa Treats, Torres Strait Scrambler	Southeast Asia, Australia

Basal Angiosperm Species Planted in Other Gifford Arboretum Exhibits

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	Location
8	Piperales	Aristolochiaceae	Aristolochioideae	<i>Aristolochia philippiensis</i>	N/A	Philippines	Exh. 13 - What is a tree
5	Magnoliales	Annonaceae	Annonoideae	<i>Annona glabra</i>	Pond Apple	FL, Central America, and northern South America	Exh. 12 - South Florida Natives
14	Canellales	Canellaceae	N/A	<i>Canella winterana</i>	Wild Cinnamon, Bahama White Bark	Florida Keys to Barbados	Exh. 12 - South Florida Natives
44	Laurales	Lauraceae	Lauroideae	<i>Licaria triadra</i>	Gulf Licaria, Pepperwood	Florida, West Indies, Central America	Exh. 12 - South Florida Natives
103	Magnoliales	Myristicaceae	N/A	<i>Myristica fragrans</i>	Nutmeg & Mace	Banda Islands of the Moluccas (E Indonesia)	Exh. 14 - Maya Cocoa
48, 49, 50	Laurales	Lauraceae	Lauroideae	<i>Nectandra coriacea (=Ocotea)</i>	Lancewood	South Florida, Mexico to Honduras, WI	Exh. 12 - South Florida Natives

Non-Representative Species Planted in the Basal Angiosperm Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	G.A. Exhibit in which Non-Angiosperm Species Belong, if any
100	Boraginales	Boraginaceae	N/A	<i>Cordia taguayhensis</i>	N/A	Brazil	
101	Lamiales	Acanthaceae	N/A	<i>Eranthemum pulchellum</i>	Blue Sage	India, Himalayas, western China	Exh.2 - Malpighiales
102	Gentianales	Rubiaceae	N/A	<i>Hamelia cuprea</i>	Bahama Firebush	Bahamas, Greater Antilles	Exh. 12 -South Florida Natives,Exh. 14 - Maya Cocoa
104	Asteraes	Asteraceae	N/A	<i>Lepidoploa arbuscula</i>	Bahama Veroana	Endemic to Bahamas	

Exhibit 10 - Sapindales

The Sapindales order consists of 9 families (although some botanists believe that this number should be reduced to 8). They include the Rutaceae and Anacardiaceae, which contain some of the world's most widely loved fruit trees.

The Rutaceae family includes members of the genus *Citrus*, as well as species like kumquat (*Fortunella margarita*). The key lime (*Citrus aurantifolia*) is one of several *Citrus* species that are growing in the Gifford Arboretum. Although sometimes considered a Florida native, key lime's actual place of origin is Southeast Asia. It is believed that Ponce de Leon brought key lime to Florida in the 16th century, but its exact date of arrival is uncertain.

Key lime is one of the few citrus species (and Sapindales fruit trees generally) that can be successfully grown from seed and that will bear fruit that “comes true” to the parent tree. Many fruit trees need to be grafted or the fruit of the tree grown from seed will be of uncertain (and often poorer) quality. Grafted fruit trees (including key lime) will also produce fruit sooner than seedling trees.

Another Rutaceae species of interest in the Arboretum is white sapote (*Casimiroa edulis*). Its fruit has a sweet, unusual taste that reminds some of citrus pudding. However, its strange taste, and somewhat bitter aftertaste, cause people to usually either love it or not like it at all. However, improved cultivars have eliminated the slightly bitter aftertaste.

The Anacardiaceae family includes the luscious mango (*Mangifera indica*) as well as cashew (*Anacardium occidentale*), both of which are growing in the Arboretum. However, this is the same family as poison ivy (*Toxicodendron radicans*), and many of its species contain oils that are skin irritants. So, be careful when handling the fruit or otherwise coming in contact with the sap of species in this family. They should also generally not be used as firewood as some of them will also cause respiratory irritation if their smoke is inhaled.

Despite the allergies that some people have to the sap and, much more rarely, even the fruit, mangoes are one of the most important, widely (and passionately!) loved tropical fruits in the world. Mango is the national fruit of India, Pakistan, and the Philippines, and it is the national tree of Bangladesh. While native to the Indian subcontinent, mangoes are cultivated today in almost all tropical and subtropical regions of the world.

Here in southern Florida, it is believed that we have one of the largest, if not the largest, selection of mango cultivars growing anywhere. A variety called “Tommy Atkins” that was developed in South Florida from a “Haden” mango seedling that first fruited in 1940 has become probably the world's most widely grown cultivar for commercial use. Despite its somewhat fibrous flesh and mediocre taste, growers worldwide have embraced “Tommy Atkins” for its exceptional productivity, disease resistance, long shelf-life, transportability, size, and appealing color. In the Arboretum,

we have a “Fairchild” mango tree, which is generally regarded as a superior tasting mango to “Tommy Atkins.”

Cashew is native to tropical South America. However, it is now grown commercially throughout Southern and Southeastern Asia, as well as in Africa. Yet another example of how foods have moved around the world and found new uses in the process, cashew nuts are commonly used in Indian cuisine, particularly Indian curries. However, in its native areas, many people enjoy the sweet pulp of the cashew apple most, and even find the nut production process tedious and not worth the effort..

What is commonly considered the fruit of this tree is actually a pear shaped structure that grows from the pedicle or receptacle of the cashew flower. Called “cashew apple,” it has a strong smell and sweet taste, but it is not really a fruit. Although the pulp of the cashew apple is very juicy, the fragile skin makes it unsuitable for transport. However, in Brazil and other parts of Latin America, the juice and pulp are commonly available and enjoyed as a fruit drink amongst other culinary uses.

The true cashew fruit is a drupe, found at the bottom of the cashew apple, and it contains a single seed. That seed is commonly known as the cashew “nut,” a usage that derives from its culinary uses. However, in the botanical sense, it is merely a seed rather than a nut because it doesn't have a hard, dry outer wall that doesn't crack open upon maturity.

Surrounding the cashew seed is a potent skin irritant that warrants caution. While roasting the cashew seeds destroys this toxin, workers need to be careful to not inhale the smoke during this process as it can cause severe or even fatal lung irritation. While some people are also allergic to eating cashew nuts (like some are allergic to eating mangoes), this allergy is less common than allergies to either true nuts or peanuts.

Another important Sapindales family, the Meliaceae, contains neem (*Azadirachta indica*), a handsome tree that can also be seen in the Arboretum. Neem has been used for thousands of years by practitioners of traditional medicine in India who believe that all parts of the tree have medicinal properties. Neem has also proven toxic to many insects, including termites, and azadirachtin is now incorporated into many commercial pesticides. Neem leaves make good fodder, and oil from the seeds has traditionally been used as a fuel for lamps. Today, neem compounds have been used as active agents against bacteria, fungi and nematodes, and even as a potent spermicide.

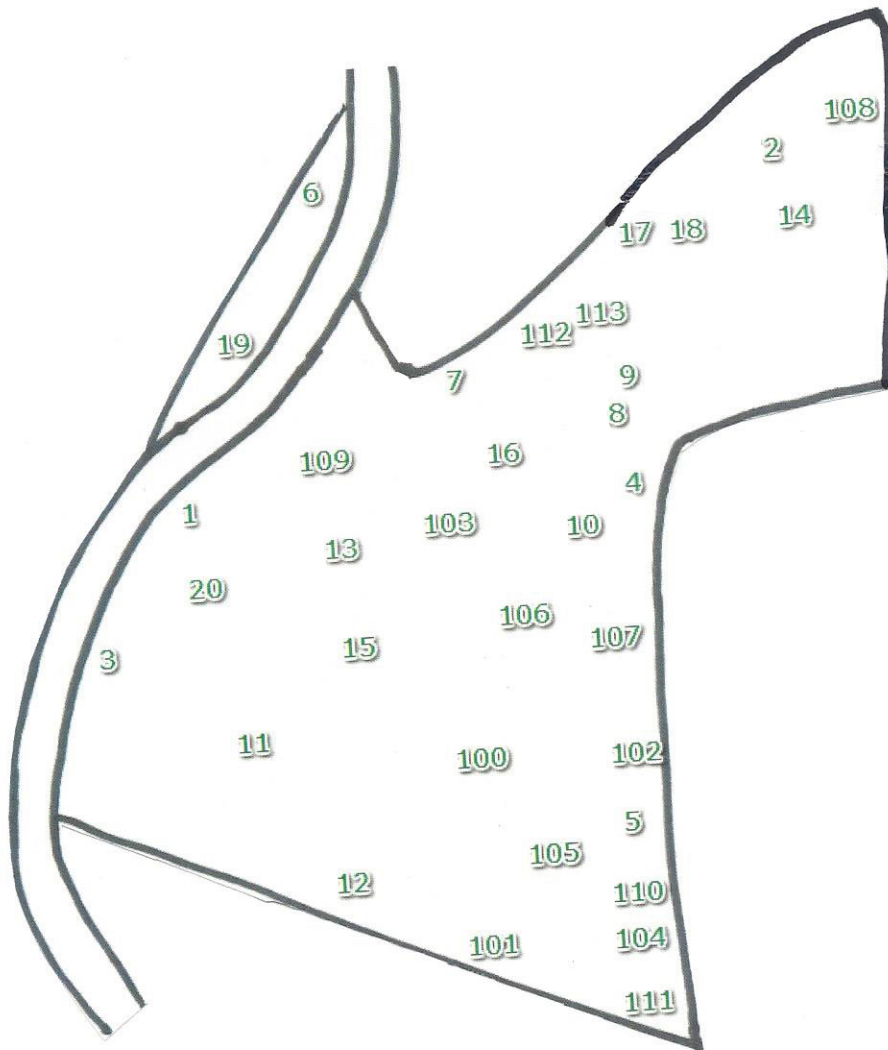
Other important members of the Meliaceae family that are growing in the Arboretum include two species of mahogany. West Indian mahogany (*Swietenia mahagoni*) is a well known tree that is native to the Florida Keys, but widely used as a street tree throughout southern Florida. West Indian mahogany can be seen in several exhibits, including Exh 13, the What is a Tree? exhibit.

Big leaf mahogany (*Swietenia macrophylla*) is a gigantic tree from Central America, the Amazon region of South America, and parts of the Caribbean, and a

specimen can be observed growing in Exhibit 14, the Maya Cocoa Garden exhibit. It is an emergent species that develops huge buttress roots as it grows to tower over its neighbors. Although traditionally an important source of timber and a fine wood used in making furniture, it is now protected in its native areas. While both mahogany species were taken to Asia for commercial production, a borer insect has caused them to be increasingly surpassed by teak as the major species cultivated worldwide for making furniture.

Other Sapindales families are the Burseraceae, which includes gumbo limbo (*Bursera simaruba*), a native tree species that grows in Exhibit 12, the South Florida Natives exhibit, and the Sapindaceae, the namesake family for this order that includes the maples. Red maple (*Acer rubrum*) is another native species that can be seen in the South Florida Natives Exhibit. Another member of the Sapindaceae family is akee (*Blighia sapida*). It is from West Africa, but is cultivated and much loved in the Caribbean, especially in Jamaica where akee and salt fish is the national dish. However, care must be taken in eating this fruit (whose buttery-nutty flavor reminds some of scrambled eggs) as it is poisonous if not properly harvested and prepared.

Exhibit 10 – Sapindales



- 1 *Aegle marmelos*
- 2 *Aglaia argentea*
- 3 *Anacardium occidentale*
- 4 *Azadirachta indica*
- 5 *Bursera simaruba*
- 6 *Casimiroa edulis*
- * 7 *Citrus aurantifolia*
- 8 *Citrus hystrix*
- 9 x *Citrofortunella mitis*
- * 10 *Commiphora africana*
- 11 *Deinbollia oblongifolia*
- 12 *Dimocarpus longan*

- 13 *Fortunella margarita*
- 14 *Harpephyllum caffrum*
- 15 *Mangifera indica*
- 16 *Murraya koenigii*
- 17,18 *Sclerocarya birrea*
- 19 *Swinglea glutinosa*
- 20 *Triphasia trifolia*
- Non-Sapindales
- 100 *Averrhoa bilimbi*
- 101 *Averrhoa carambola*
- 102 *Chrysobalanus icaco*

- 103 *Calycophyllum spruceanum*
- 104 *Coccoloba diversifolia*
- 105 *Coccoloba pubescens*
- 106 *Coccoloba rugosa*
- 107 *Coccoloba uvifera*
- 108 *Delonix regia*
- 109 *Gymnostoma nobile*
- 110, 111 *Hamelia patens*
- 112 *Quercus virginiana*
- 113 *Petrea volubilis*

The Sapindales Exhibit
Exhibit 10 - Color Code =

Representative Species Planted in Sapindales Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin
1	Sapindales	Rutaceae	Citroideae	<i>Aegle marmelos</i>	Bael fruit	India, Myanmar, Pakistan, Bangladesh, Indochina
2	Sapindales	Meliaceae	Melioidae	<i>Aglaia argentea</i>	Aglaia, Silver Boodyarra	Australia, southern Asia, Philippines
3	Sapindales	Anacardiaceae	Anacardioidae	<i>Anacardium occidentale</i>	Cashew, marañon	Northeastern Brazil
4	Sapindales	Meliaceae	Melioidae	<i>Azadirachta indica</i>	Neem	India and Indian subcontinent
5	Sapindales	Burseraceae	N/A	<i>Bursera simaruba</i>	Gumbo limbo	Southern Florida, Mexican, Caribbean, Brazil & Venezuela
6	Sapindales	Rutaceae	Citroideae	<i>Cosmira edulis</i>	White Sapote	Central Mexico to Costa Rica
7	Sapindales	Rutaceae	Citroideae	<i>Citrus aurantifolia</i>	Key Lime	SE Asia
8	Sapindales	Rutaceae	Citroideae	<i>Citrus hystrix</i>	Kaffir Lime	Tropical Asia
9	Sapindales	Rutaceae	Citroideae	<i>xCitrofortunella mitis</i>	Calamondin	China
10	Sapindales	Burseraceae	N/A	<i>Commiphora africana</i>	African Myrrh	Africa: Sahel
11	Sapindales	Sapindaceae	Sapindoideae	<i>Deinbollia oblongifolia</i>	Dune Soapberry	Southern Africa: coastal forests
12	Sapindales	Sapindaceae	Sapindoideae	<i>Dimocarpus longan (=Euphoria longana)</i>	Longan, Mamoncillo Chino	South China
13	Sapindales	Rutaceae	Citroideae	<i>Fortunella margarita 'Meiwa'</i>	Kumquat 'Meiwa'	Oval Kumquat
14	Sapindales	Anacardiaceae	Anacardioidae	<i>Harpephyllum coffrum</i>	Wild Plum	South Africa
15	Sapindales	Anacardiaceae	Anacardioidae	<i>Mangifera indica 'Fairchild'</i>	Mango 'Fairchild'	Only in cultivation (sp. from Myanmar, India)
16	Sapindales	Rutaceae	Citroideae	<i>Murraya koenigii</i>	Curry-leaf	China, SE Asia, India, Sri Lanka
17,18	Sapindales	Anacardiaceae	Anacardioidae	<i>Sclerocarya birrea</i>	Marula	South Africa
19	Sapindales	Rutaceae	Citroideae	<i>Swinglea glutinosa</i>	Tabog	Philippines
20	Sapindales	Rutaceae	Citroideae	<i>Triphasia trifolia</i>	Limeberry	Indonesia

Sapindales Species Planted in Other Gifford Arboretum Exhibits

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	Location
2	Sapindales	Aceraceae	Hippocastanoideae	<i>Acer rubrum</i>	Red Maple	Eastern North America	Exh. 12 - South Florida Natives
4	Sapindales	Rutaceae	Toddalioideae	<i>Amyris elemifera</i>	Torchwood	Florida, Caribbean, Central America	Exh. 12 - South Florida Natives
100	Sapindales	Meliaceae	Melioidae	<i>Aphananixis polystachya</i>	Pithraj	S. China to New Guinea, India, Sri Lanka	Exh. 5 - Ericales
101	Sapindales	Sapindaceae	Sapindoideae	<i>Bilghia sapida</i>	Akee	West Africa	Exh. 4 - Moraceae
12,13	Sapindales	Burseraceae	N/A	<i>Bursera simaruba</i>	Gumbo-Limbo	Southeastern U.S., Mexico, Central America	Exh. 12 - South Florida Natives
101	Sapindales	Meliaceae	Melioidae	<i>Cedrela odorata</i>	Cigarbox Cedar, Spanish Cedar, Cedro hembra	West Indies	Exh. 5 - Ericales
33a, 33b, 33c	Sapindales	Sapindaceae	Dodonaeoideae	<i>Exothea paniculata</i>	Inkwood	S. FL West Indies, Mexico and Central America	Exh. 12 - South Florida Natives
103	Sapindales	Sapindaceae	Dodonaeoideae	<i>Harpullia pendula</i>	Tulipwood	Eastern Australia	Exh. 11 - Malvales
105	Sapindales	Meliaceae	Melioidae	<i>Khaya senegalensis</i>	African mahogany, Gambia mahogany,	Western Tropical Africa and Uganda	Exh. 5 - Ericales
36	Sapindales	Sapindaceae	Sapindoideae	<i>Melicoccus bijugatus</i>	Spanish Lime, Mamoncillo, Ganep	Central America, Caribbean, Columbia, Venezuela.	Exh. 14 - Maya Cocoa
69, 70	Sapindales	Simaroubaceae	N/A	<i>Simarouba glauca</i>	Paradise Tree	Southern Florida, tropical S. America and Lesser Antilles	Exh. 12 - South Florida Natives
112	Sapindales	Anacardiaceae	Spondioidae	<i>Spondias mombin</i>	Yellow Mombin, Spanish Plum	Tropical Americas	Exh. 5 - Ericales
113	Sapindales	Anacardiaceae	Spondioidae	<i>Spondias purpurea</i>	Purple Mombin, Hog Plum, Jocote	Tropical Americas	Exh. 5 - Ericales
56	Sapindales	Meliaceae	Cedreloideae	<i>Swietenia macrophylla</i>	Big leaf mahogany, Punab, Honduras mahogany	Mexico, Central America, northern South America	Exh. 14 - Maya Cocoa
104	Sapindales	Meliaceae	Swietenioideae	<i>Swietenia mahagoni</i>	Caribbean Mahogany	South Florida and Caribbean	Exh. 2 - Malpighiales
50	Sapindales	Meliaceae	Swietenioideae	<i>Swietenia mahagoni</i>	Caribbean Mahogany	Native- Cape FL, FL Keys, Bahamas, West Indies	Exh. 13 - What is a tree
51	Sapindales	Meliaceae	Swietenioideae	<i>Swietenia mahagoni</i>	Caribbean Mahogany	Native- Cape FL, FL Keys, Bahamas, West Indies	Exh. 13 - What is a tree
72	Sapindales	Meliaceae	Swietenioideae	<i>Swietenia mahagoni</i>	Mahogany	Florida, Caribbean	Exh. 12 - South Florida Natives
53	Sapindales	Rutaceae	Toddalioideae	<i>Zanthoxylum fagara</i>	Wild Lime	Florida, Texas, Mexico, C. America, S. America as far south as Paraguay	Exh. 13 - What is a tree

Non-Representative Species Planted in the Sapindales Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	G.A. Exhibit in which Non-Sapindales Species Belong, if any
100	Oxalidales	Oxalidaceae	N/A	<i>Averrhoa bilimbi</i>	Bilimbi/Cucumber Tree	Exact origin obscure, probably Indonesia	N/A
101	Oxalidales	Oxalidaceae	N/A	<i>Averrhoa carambola</i>	Carambola/Starfruit	Exact origin obscure, probably Indonesia	N/A
102	Malpighiales	Chrysobalanaceae	N/A	<i>Chrysobalanus icaco</i>	Coco plum	Tropical Americas, Florida	Exh. 2 - Malpighiales, Exh. 12 - South Florida Natives, Exh. 14 - Maya Cocoa
103	Gentianales	Rubiaceae	Ixoroideae	<i>Calycophyllum spruceanum</i>	Capirona	Bolivia, Colombia, Ecuador, Peru & Brazil	N/A
104	Caryophyllales	Polygonaceae	Eriogonoideae	<i>Coccoloba diversifolia</i>	Pigeonplum, Doveplum	Coastal areas of Caribbean, Central America, Southern Mexico, South Florida	Exh. 12 - South Florida Natives, Exh. 14 - Maya Cocoa
105	Caryophyllales	Polygonaceae	Eriogonoideae	<i>Coccoloba pubescens</i>	Eve's Umbrella	Coastal regions of Caribbean	N/A
106	Caryophyllales	Polygonaceae	Eriogonoideae	<i>Coccoloba rugosa</i>	Tin Roof tree, Ortegón	Caribbean	N/A
107	Caryophyllales	Polygonaceae	Eriogonoideae	<i>Coccoloba uvifera</i>	Sea Grape	S FL Coastal Woodlands & Keys, Caribbean, Tropical America	Exh. 12 - South Florida Natives, Exh. 14 - Maya Cocoa
108	Fabales	Fabaceae	Caesalpinioideae	<i>Daltonia regia</i>	Poinciana	Madagascar	Exh. 6 - Fabaceae
109	Fagales	Casuarinaceae	N/A	<i>Gymnostoma nobile</i>	Amun (Borneo)	Southeast Asia	N/A
110, 111	Gentianales	Rubiaceae	Cinchonoideae	<i>Hamelia patens</i>	Firebush	American subtropics and tropics, FL	Exh. 12 - South Florida Natives, Exh. 14 - Maya Cocoa
112	Fagales	Fagaceae	Quercuoideae	<i>Quercus virginiana</i>	Live Oak	Florida, SE US, Texas	Exh. 12 - South Florida Natives
113	Lamiales	Verbenaceae	Verbenoideae	<i>Petrea volubilis</i>	Sandpaper vine	Mexico and Central America	Exh. 14 - Maya Cocoa

Exhibit 11 - Malvales

This order comprises the hibiscus and mallow groups, and contains important economic species like cotton, chocolate, okra, kapok and balsa. It has 10 families, with the Malvaceae being both the biggest (204 genera and 2,330 species) and the most important to man.

The Malvaceae traditionally included hibiscus and its relatives, but the family has been greatly expanded in recent years as the Sterculiaceae, Bombacaceae, and other families were lumped into this family based on genetic analysis. We have *Hibiscus acetosella* (false roselle) and *Hibiscus schizopetalus* (parasol or fringed hibiscus) in the Arboretum. The latter comes from tropical East Africa, and it has been used in creating hybrids with *Hibiscus rosa-sinensis* that have produced some of the world's showiest flowers.

Closely related to Hibiscus are the Pavonia and Malvaviscus genera. With flowers that look like an unopened hibiscus because the petals are spirally folded like an umbrella, *Malvaviscus penduliflorus* (turk's cap) is a large, sprawling shrub from tropical America with red to occasionally pink or white flowers. *Pavonia bahamensis* is a shrub from the Bahamas and Florida Keys that produces small, yellow flowers that also do not open but attract hummingbirds during the winter.

The Bombacoideae subfamily includes *Ceiba pentandra* (kapok), a giant tree that is sometimes called the "king of the jungle" in areas of Central America and northern South America where it grows naturally, usually shooting straight up until it reaches the top of the canopy where it then branches out over the other trees. It had spiritual significance to the Mayans and its seed pods are filled with a cotton-like substance called "kapok," which has economic value to man although its evolutionary purpose was simply seed dispersal. Also producing kapok, *Ceiba speciosa* (f/k/a *Chorisia speciosa*) (silk floss) is one of the world's most spectacular flowering trees, with profuse displays of large pink blossoms in the fall.

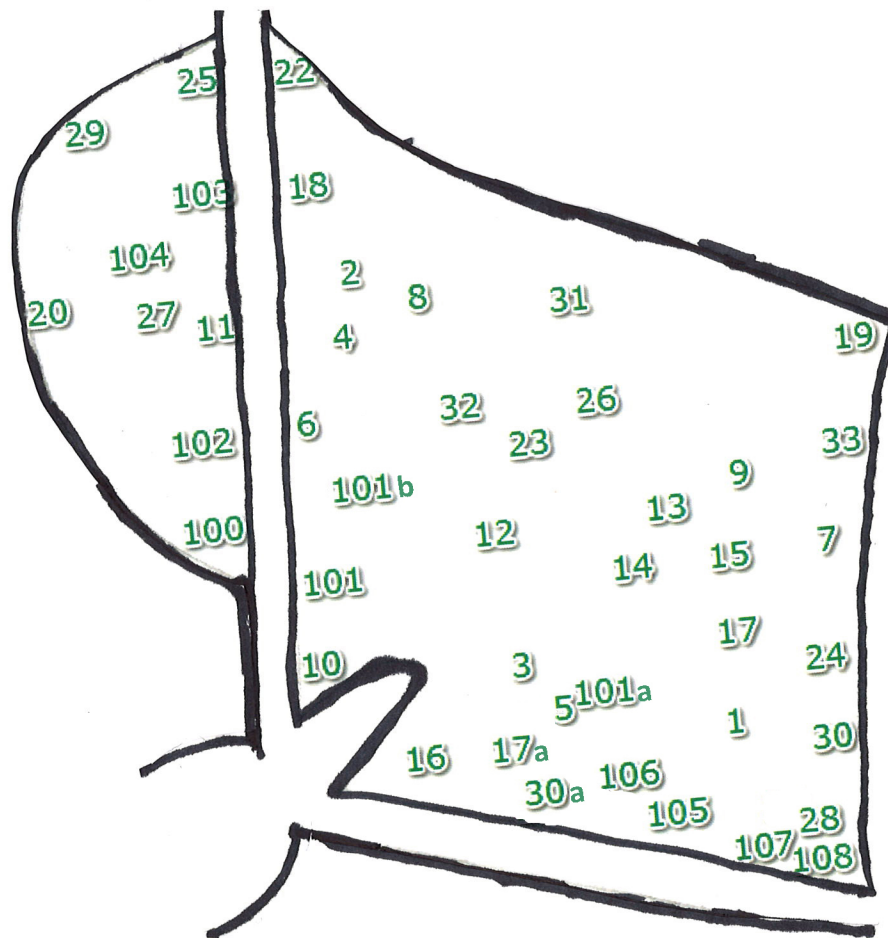
The flower of another showy member, *Pseudobombax ellipticum* (Shaving Brush), is the logo of the Gifford Arboretum. We have both the pink and white flowering cultivars, and besides their large flowers with many stamens, this species is characterized by a gray to green, smooth trunk with stripes, and large palmate leaves that emerge red in the spring before turning green. For unknown reasons, the white flowering cultivars usually bloom during the winter, often months before the red flowering trees start to bloom in the spring.

The most important bombax species for wood is *Ochroma pyramidale*, the balsa tree. Balsa wood has one of the highest tensile strengths of any wood, and because it is highly flexible and light, it is highly prized for certain uses. It was used for early boats and its flexibility, paired with its strength, made it an ideal material for withstanding storms.

The Sterculioideae subfamily includes *Sterculia foetida* (Indian almond), a large tree from India and Southeast Asia that produces a buttressed trunk and clusters of muddy-red flowers. The flowers emit a fetid odor, undoubtedly to attract bats or other pollinators that are attracted to such smells. It is named after Sterculius, the god of manure, and another common name is "stinky manure" tree. However, the odor is not really that bad, and this species is used in Rio de Janeiro as a street tree.

Except for possibly cotton, the most economically important member of this group is *Theobroma cacao* (cacao), the source of chocolate! This small tree is from Mexico, Central America, and South America, and it was cultivated for centuries by the Mayans and Aztecs. They also used the sweet pulp to make drinks, including alcoholic beverages and the fresh fruit is still widely used in some areas, including Brazil. However, the seeds are the source of chocolate, as well as cocoa and cocoa butter. This species is an “ultra tropical” meaning that it can only be grown easily in areas where frost is never an issue. Scientists at the USDA/ARS station in Miami are working with molecular markers and genetic analysis to identify cultivars that not only produce the best quality chocolate, but are also the most disease resistant.

Exhibit 11 – Malvales



- | | | |
|---|------------------------------------|--------------------------------------|
| 1 <i>Abelmoschus manihot</i> | 16 <i>Heritiera littoralis</i> | 31 <i>Sterculia foetida</i> |
| 2 <i>Bakeridesia integerrima</i> | 17 <i>Hibiscus acetosella</i> | 32 <i>Theobroma cacao</i> |
| 3 <i>Berrya cubensis</i> | 17a <i>Hibiscus poepigii</i> | 33 <i>Thespesia grandiflora</i> |
| 4 <i>Bixa orellana</i> | 18 <i>Hibiscus schizopetalus</i> | |
| 5 <i>Brachychiton acerifolius</i> | 19 <i>Lagunaria patersonia</i> | <u>Non Malvales</u> |
| 6 <i>Cavanillesia platanifolia</i> | 20 <i>Luehea seemannii</i> | 100 <i>Clerodendrum incisum</i> |
| 7 <i>Cochlospermum vitifolium</i> | 22 <i>Muntingia calabura</i> | <i>macrosiphon</i> |
| 8 <i>Cola acuminata</i> | 24 <i>Pachira insignis</i> | 101 <i>Clerodendrum wallichii</i> |
| 9 <i>Commersonia bartramia</i> | 25 <i>Pachira glabra</i> | * 101a <i>Buddelia davidii</i> |
| 10 <i>Dombeya burgessiae</i> x Seminole | 26 <i>Pavonia bahamensis</i> | 101b <i>Elaeocarpus grandifloras</i> |
| 11 <i>Dombeya wallichii</i> | 27 <i>Phaleria octandra</i> | 102 <i>Harpullia pendula</i> |
| 12 <i>Firmiana colorata</i> | 28 <i>Pseudobombax ellipticum</i> | 103 <i>Holoptelea integrifolia</i> |
| 13 <i>Grewia flava</i> | 29 <i>Pterospermum acerifolium</i> | 104 <i>Moringa oleifera</i> |
| * 14 <i>Grewia tenax</i> | 30 <i>Sterculia Africana</i> | 105 <i>Nyctanthes arbor-tristis</i> |
| 15 <i>Grewia villosa</i> | 30a <i>Sterculia ceramica</i> | 106 <i>Senna didymobotria</i> |
| | | * 107 <i>Stapelia gigantea</i> |
| | | 108 <i>Stapelia leendertziae</i> |

The Malvales Exhibit

Exhibit 11 - Color Code =

Representative Species Planted in the Malvales Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin
1	Malvales	Malvaceae	Malvoideae	<i>Abelmoschus manihot</i>	Aibika, Hibiscus manihot	East Asia to northern Australia
2	Malvales	Malvaceae	Malvoideae	<i>Bakeridesia integerrima</i>	Indian Mallow Bush, Canary Mallow Tree	Central America
3	Malvales	Malvaceae	Brownlowioideae	<i>Berrya cubensis</i>	Cortalgua Morada	West Indies, Mexico & Central America
4	Malvales	Bixaceae	N/A	<i>Bixa orellana</i>	Annatto, Lipstick	South America
5	Malvales	Malvaceae	Sterculioideae	<i>Brachychiton acerifolius</i>	Flame Tree	Australia (Queensland)
6	Malvales	Malvaceae	Bombacoideae	<i>Cavanillesia platanifolia</i>	Canoe Tree, Cuipo	Central America and northern South America.
7	Malvales	Cochlospermaceae	N/A	<i>Cochlospermum vitifolium</i>	Poro-poro, Buttercup Tree,	Central America: dry forests
8	Malvales	Malvaceae	Sterculioideae	<i>Cola acuminata</i>	Kola Nut	West Africa
9	Malvales	Malvaceae	Byttnerioideae	<i>Commersonia bartramia</i>	Brown Kurrjong	E Australia: Queensland, New South Wales; Malaysia
10	Malvales	Malvaceae	Dombeyoideae	<i>Dombeya burgessiae</i> x <i>Seminole</i>	Seminole Dombeya	Man Created Hybrid
11	Malvales	Malvaceae	Dombeyoideae	<i>Dombeya wallichii</i>	Pink Ball Tree	Tropical East Africa and Madagascar.
12	Malvales	Malvaceae	Sterculioideae	<i>Firmiana colorata</i>	Bonfire Tree, Colored Sterculia	Western Ghat Mountains of India.
13	Malvales	Malvaceae	Grewioideae	<i>Grewia flava</i>	Brandybush, Velvet Raisin, /Gloai	East & Southern Africa
14	Malvales	Malvaceae	Grewioideae	<i>Grewia tenax</i>	White Cross Berry	N South Africa and Namibia to Ethiopia and Arabia and through W Africa
15	Malvales	Malvaceae	Grewioideae	<i>Grewia villosa</i>	Mallow Raisin	South Africa
16	Malvales	Sterculiaceae	Sterculioideae	<i>Heritiera littoralis</i>	Looking Glass Mangrove	East Africa and Southeastern Asia
17	Malvales	Malvaceae	Malvoideae	<i>Hibiscus acetosella</i>	False Roselle, African Rose Mallow	E & Central Africa
17a	Malvales	Malvaceae	Malvoideae	<i>Hibiscus poeppigii</i>	Poeppig's Rosemallow	S. Florida, Cuba, Jamaica, Mexico
18	Malvales	Malvaceae	Malvoideae	<i>Hibiscus schizopetalus</i>	Parasol or Fringed Hibiscus	East Africa
19	Malvales	Malvaceae	Bombacoideae	<i>Lagunaria patersonia</i>	Pyramid Tree	Endemic to Lord Howe Island, Norfolk Island, and coastal Queensland, Australia
20	Malvales	Malvaceae	Grewioideae	<i>Luehea seemanii</i>	Guácimo Colorado	Guatemala to Colombia
22	Malvales	Muntingiaceae	N/A	<i>Muntingia calabura</i>	Jamaican Cherry, Strawberry Jam Tree	Central America
24	Malvales	Malvaceae	Bombacoideae	<i>Pachira insignis</i>	Money Tree	Central and South America
25	Malvales	Malvaceae	Bombacoideae	<i>Pachira glabra</i>	French Peanut	Tropical America
26	Malvales	Malvaceae	Malvoideae	<i>Pavonia bahamensis</i>	N/A	Bahamas
27	Malvales	Thymelaeaceae	Phalerioideae	<i>Phaleria octandra</i>	Scrub Daphne, White Daphne, Dwarf Phaleria	Australia (Queensland)
28	Malvales	Malvaceae	Bombacoideae	<i>Pseudobombax ellipticum</i>	White Shaving Brush	Central America, West Indies
29	Malvales	Malvaceae	Dombeyoideae	<i>Pterospermum acerifolium</i>	Dinner Plate Tree, Maple-Leafed Bayur	SE Asia from India to Myanmar
30	Malvales	Malvaceae	Sterculioideae	<i>Sterculia africana</i>	African Star Chesnut	East Africa from Sudan to Mozambique; Malawi, Zimbabwe, Botswana and Namibia
30a	Malvales	Malvaceae	Sterculioideae	<i>Sterculia ceramica</i>	Fairchild's Sterculia	Indonesia, Philippines
31	Malvales	Malvaceae	Sterculioideae	<i>Sterculia foetida</i>	Bangar Nut	SE Asia, India to Australia
32	Malvales	Malvaceae	Byttnerioideae	<i>Theobroma cacao</i>	Chocolate, Cacao	Mexico
33	Malvales	Malvaceae	Malvoideae	<i>Thespesia grandiflora</i>	Flor de Maga	Endemic to NE Puerto Rico

Malvales Species Planted in Other Gifford Arboretum Exhibits

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	Location in Arboretum
1	Malvales	Malvaceae	Bombacoideae	<i>Adansonia grandidieri</i>	Giant Baobab	Madagascar	Exh. 13 - What is a Tree
21	Malvales	Malvaceae	Bombacoideae	<i>Ceiba pentandra</i>	Giant Kapok, Yáaxche'	Mexico to South America (cultivated pan-tropically)	Exh. 14 - Maya Cocoa
102	Malvales	Malvaceae	Bombacoideae	<i>Ceiba speciosa</i> (= <i>Chorisia speciosa</i>)	Pink Floss Silk Tree	Eastern Brazil to Bolivia, Peru	Exh. 5 - Ericales
30	Malvales	Malvaceae	Byttnerioideae	<i>Guazuma ulmifolia</i>	Mutamba, guácimo	Mexico, West Indies, Central & S America	Exh. 14 - Maya Cocoa
43	Malvales	Malvaceae	Bombacoideae	<i>Pachira aquatica</i>	Guiana Chestnut	Central and South America	Exh. 14 - Maya Cocoa
44a	Malvales	Malvaceae	Malvoideae	<i>Phymosia umbellata</i>	Mexican Bush Mallow	Mexico	Exh. 14 - Maya Cocoa
108	Malvales	Malvaceae	Bombacoideae	<i>Pseudobombax ellipticum</i>	Shaving Brush (pink)	Southern Mexico and Central America	Exh. 1 - Arecaeae
46	Malvales	Malvaceae	Malvoideae	<i>Quararibea funebris</i>	Cacahuachiti, Rosita de Cacao, Funeral Tree	Mexico to S America	Exh. 14 - Maya Cocoa

Non-Representative Species Planted in the Malvales Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	G.A. Exhibit in which Non-Malvales Species Belong, if any
100	Lamiales	Lamiaceae	Ajugoideae	<i>Clerodendrum incisum macrosiphon</i> (= <i>Rotheca incisa</i>)	Musical Notes	Tropical East Africa	N/A
101	Lamiales	Lamiaceae	Ajugoideae	<i>Clerodendrum wallichii</i> (= <i>C. nutans</i>)	Bridal Veil	India	N/A
101a	Lamiales	Scrophulariaceae	NA	<i>Buddleja davidii</i>	Butterfly-bush	Temperate Asia-China	N/A
101b	Oxalidales	Elaeocarpaceae	N/A	<i>Elaeocarpus grandiflorus</i>	Lily of the Valley, Fairy Petticoats	India to Malaysia	N/A
102	Sapindales	Sapindaceae	Dodoniaeideae	<i>Harpullia pendula</i>	Tulipwood	Eastern Australia	Exh. 10 - Sapindales
103	Rosales	Ulmaceae	In Dispute	<i>Holoptelea integrifolia</i>	Indian Elm	India	Exh. 4 - Rosales
104	Capparales	Moringaceae	Brassicales	<i>Moringa oleifera</i>	Horseradish Tree, Drumstick	Southern Himalayan Mountains of India	N/A
105	Lamiales	Oleaceae	N/A	<i>Nyctanthes arbor-tristis</i>	Parijat	Southern Asia	N/A
106	Fabales	Fabaceae	Caesalpinioideae	<i>Senna didymobotrya</i>	Popcorn Cassia	Tropical Africa	Exh 6 - Favaceae
107	Gentianales	Apocynaceae	Asclepiadoideae	<i>Stapelia gigantea</i>	Carrian Plant, Zulu Plant	South eastern Africa	N/A
108	Gentianales	Apocynaceae	Asclepiadoideae	<i>Stapelia leendertziae</i>	Maroon Cup Starfish	South Africa, Zimbabwe	N/A

Exhibit 12 – South Florida Native Trees

South Florida's native flora is an interesting blend of temperate trees that have migrated south and tropical trees that have migrated north from the tropics, primarily from the Caribbean, through the services of migratory birds, wind, and ocean currents. Here in South Florida, we have oaks, maples, and magnolias that have migrated down the state growing alongside West Indian mahogany, gumbo limbo, pigeon plum, and sea grape that have arrived from the tropics. As a result of the relatively short time that South Florida has been dry land, it has only a few species that are endemic, meaning that they are native only to this region.

At the Gifford Arboretum, visitors can observe approximately 90% of the 130 species of Florida native trees, with most of the missing ones consisting of temperate species that grow upstate but do not like the soils and/or weather of South Florida. Besides common native trees like live oak (*Quercus virginiana*), red maple (*Acer rubrum*), West Indian mahogany (*Swietenia mahagoni*), sea grape (*Coccoloba uvifera*), and gumbo limbo (*Bursera simaruba*), one can see and learn about many of the less common natives that deserve to be more widely planted and appreciated.

These include bald cypress (*Taxodium distichum*), which grows naturally in swamps and freshwater wetlands throughout much of Florida. Even in our mild winters, bald cypress trees are deciduous, meaning that they will drop their leaves and enter a period of dormancy. When new leaves sprout in spring, the lovely green sheen of the fresh, feather-like (pinnate) leaves is a beautiful sight, especially when accompanied by views of wood storks and their young nesting high in large trees growing in natural areas like Audubon's Corkscrew Swamp Sanctuary. Growing to heights in excess of 115 feet, bald cypress are not only some of the largest organisms in Florida, but they are also the oldest trees east of the Mississippi River, with some trees attaining ages in excess of 3,000 years! Another interesting feature of bald cypress is that they will grow "knees," the name given to the vertical, wood sprouts that grow above ground from the roots of this tree. No one is certain of their evolutionary or botanical purpose, but explanations range from their functioning to stabilize the trees structurally, to helping the tree access air for the carbon dioxide used in photosynthesis, to helping the trees expel toxins.

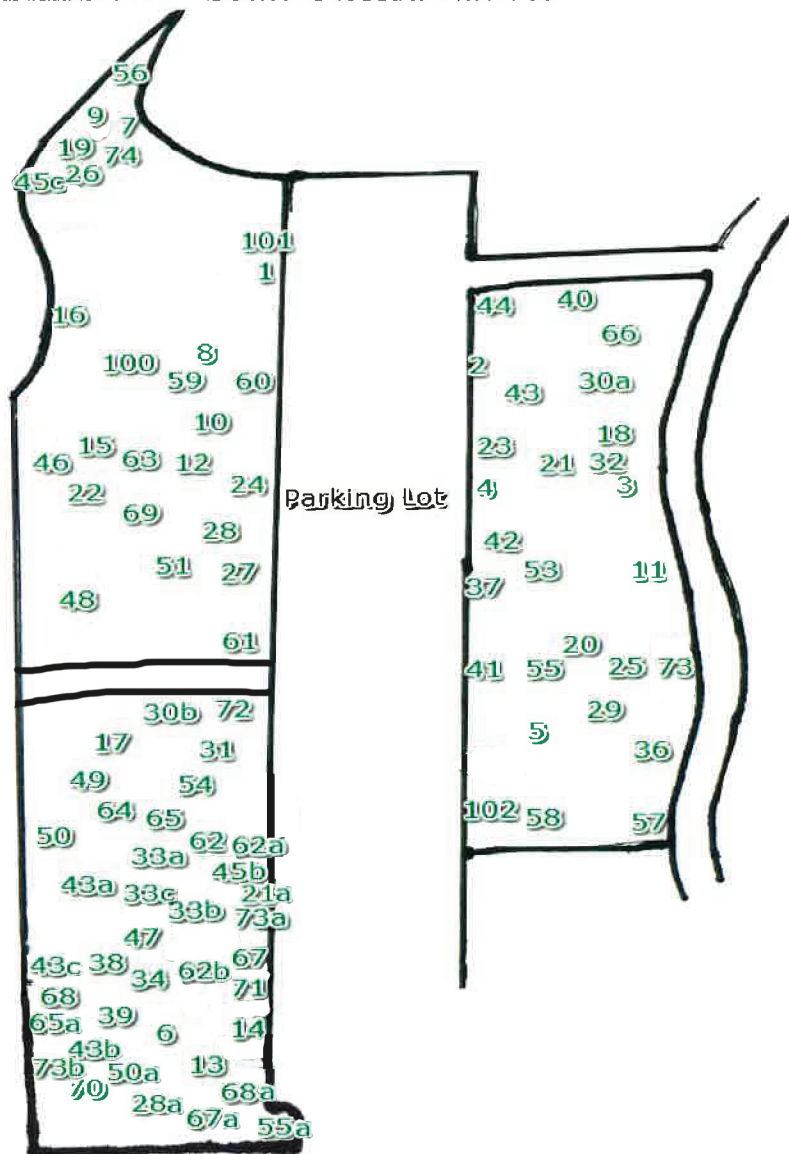
Another Florida native that is one of the most loved and beautiful trees in the Arboretum is lignum vitae a/k/a lignumvitae (*Guaiacum sanctum*). This is a slow growing tree that is very showy when it produces masses of small, lavender flowers in the spring and summer. Its dark green leaflets are lovely at all times, but the tree becomes striking when it is in bloom! Pollinated flowers are followed by yellow fruit that open to reveal red seeds. This is an endangered species, and it almost became extirpated from the wilds of Florida when it was cut for its heavy, strong wood that has the special attribute of being self-lubricating due to oils in the wood. This latter feature means that it can withstand much greater friction than most trees without combustion and, prior to the age of steel, the trees were in great demand for moving parts like axles, propeller shafts and even ball bearings. Some of the oldest and largest specimens in Florida are now preserved and can be seen at Lignumvitae Key Botanical State Park. What saved those trees is that the island is surrounded by shallow flats that made it impossible for any boats of size to get to shore for harvesting and removal. Lignum vitae is also the national tree of the Bahamas.

Another of our native trees that is endangered and should be planted more is alvaradoa or Mexican alvaradoa (*Alvaradoa amorphoides*). It is a small to medium tree that makes a great

ornamental specimen because of its lovely, fine textured foliage and pendent, pale yellow flower clusters that, if pollinated, will be followed by pubescent, winged seeds that are light tan and tinged with red. One reason that this tree is not seen more often is that it is dioecious, meaning that male and female flowers are produced by separate plants so that at least one tree of each sex is required to produce seed.

In 2012, we started a program called the “Gifford Arboretum Plant of the Year” where a Florida native is selected, grown and distributed each year based on its benefits to Florida fauna. Our 2012 selection was Bahama strongbark (*Boufferea succulenta*), a lovely small tree with pendent branches bearing medium sized green leaves, fragrant clusters of white flowers, and colorful, small fruits that range from gold to reddish-orange. Besides being an attractive addition to any garden, it provides food and cover to many birds and butterflies, some of which are also endangered. While the range of this species includes the Bahamas, here in Florida this state-listed endangered species only occurs naturally in coastal hammocks of the Florida Keys and, allegedly, around Flamingo in Everglades National Park. Adding one of these trees to your garden will not only help the many birds and butterflies that utilize it, but may also help preserve this species. Incidentally, some feel the correct common name should be “Bahama strongback,” as it is called in the Bahamas where a tea made from its leaves is used to give men a strong back for amorous activities. Since 2012, limber caper (*Capparis flexuosa*), granny bush (*Cordia bahamensis*), inkwood (*Exothea paniculata*), and longstalked stopper (*Mosiera longipes*) were named and distributed in subsequent years to benefit local fauna. All of these can be seen in the South Florida Natives exhibit.

Exhibit 12 – South Florida Natives



- 1 *Acacia farnesiana*
- 2 *Acer rubrum*
- 3 *Alvaradoa amorphoides*
- 4 *Amyris elemifera*
- 5 *Annona glabra*
- 6 *Ardisia escallonioides*
- 7 *Baccharis dioica*
- 8 *Bourreria cassinifolia*
- 9 *Bourreria succulenta*
- 10 *Bourreria ovata*
- 11 *Bumelia celastrina*
- 12,13 *Bursera simaruba*
- 14 *Callicarpa americana*
- 16,17 *Calyptanthes pallens*
- 18 *Calyptanthes zuzygium*
- 19 *Capparis flexuosa*
- 20 *Casasia chusiifolia*
- 21 *Celtis laevigata*
- 21a *Chamaecrista deeringiana*

- 22 *Chrysophyllum oliviforme*
- 23 *Citharexylum spinosum*
- 24 *Clusia rosea*
- 25 *Colubrina elliptica*
- 26 *Cordia bahamensis*
- 27 *Drypetes diversifolia*
- 28 *Drypetes lateriflora*
- 28a *Erthalis fruticosa*
- 29 *Eugenia auxillaris*
- 30a, 30b *Eugenia confusa*
- 31 *Eugenia foetida*
- 32 *Eugenia rhombea*
- 33a-c *Exothea paniculata*
- 34 *Forestiera segregata*
- 35,36 *Fraxinus caroliniana*
- 37,38 *Guapira discolor*
- 39 *Guettarda elliptica*
- 40 *Gymnanthes lucida*
- 41 *Hamelia patens*
- 42, 43 *Ilex krugiana*

- 43a *Krugiodendron ferre*
 - * 43b *Jacqinia keyensis*
 - * 43c *Lantana dupressa*
 - 43d *Lantana involucrata*
 - 44 *Licaria triandra*
 - 45b *Morus rubra*
 - 45c *Mosiera longipes*
 - 46 *Myrcianthes fragrans*
 - 47 *Myrica cerifera*
 - 48-50 *Nectandra coriacea*
 - * 50a *Picramnia pentandra*
 - 51 *Piscidia piscipula*
 - 53 *Pisonia rotundata*
 - 54 *Pithecellobium keyense*
 - 55 *Prunus myrtifolia*
 - 55a *Psychotria ligustrifolia*
 - 56 *Psychotria nervosa*
 - 57-62 *Quercus virginiana*
 - 62a *Randia aculeata*
 - 63-65 *Sabal palmetto*
 - * 65a *Salvia coccinea*
 - 66 *Schaefferia frutescens*
 - 66a *Senna ligustrina*
 - 67 *Senna mexicana* var. *chapmanii*
 - 67a *Serona repens*
 - 68 *Sideroxylon foetidissimum*
 - 68a *Sideroxylon salicifolium*
 - 69, 70 *Simarouba glauca*
 - 71 *Sophora tomentosa*
 - 72 *Swietenia mahagoni*
 - 73 *Taxodium distichum*
 - 73a *Tetrazygia bicolor*
 - 73b *Vallesia antillana*
 - 74 *Zamia integrifolia*)
- Non-South Florida Natives
- 100 *Cordia sebestena*
 - 101 *Rubus niveus*
 - 102 *Stonglyoyden macrobotrys*

The South Florida Natives Exhibit

Exhibit 12 - Color Code =

Representative Species Planted in the South Florida Natives Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	G.A. Exhibit in which Representative Species Belong, if any
1	Fabales	Fabaceae	Mimosoideae	<i>Acacia farnesiana</i>	Sweet Acacia	South Florida	Exh. 6 - Fabaceae, Exh. 14 - Maya Cocoa
2	Sapindales	Aceraceae	Hippocastanoideae	<i>Acer rubrum</i>	Red Maple	Eastern North America	Exh. 10 - Sapindales
3	Picramniales	Picramniaceae	Alvaradoideae	<i>Alvaradoa amorphoides</i>	Mexican Alvaradoa	Mexico, Southern Florida	Exh. 14 - Maya Cocoa
4	Sapindales	Rutaceae	Toddalioideae	<i>Amyris elemifera</i>	Torchwood	Florida, Caribbean, Central America	Exh. 10 - Sapindales, Exh. 14 - Maya Cocoa
5	Magnoliales	Annonaceae	Annonoideae	<i>Annona glabra</i>	Pond Apple	FL, Central America, and northern South America	Exh. 9 - Basal Angiosperms, Exh. 14 - Maya Cocoa
6	Ericales	Myrsinaceae	Myrsinoideae	<i>Ardisia escalloniaoides</i>	Marlberry	South Florida	Exh. 5 - Ericales, Exh. 14 - Maya Cocoa
7	Asterales	Asteraceae	Asteroideae	<i>Baccharis dioica</i>	Broombrush false willow	South Florida, The West Indies and Southern Mexico	N/A
8	Incertae sedis	Boraginaceae	Boraginoideae	<i>Bourreria cassinifolia</i>	Smooth strongbark	Florida, West Indies	N/A
9	Incertae sedis	Boraginaceae	Boraginoideae	<i>Bourreria succulenta</i>	Bahama strongbark, Bodywood	Florida, Caribbean	N/A
10	Incertae sedis	Boraginaceae	Boraginoideae	<i>Bourreria ovata</i>	Bahamian strong bark	Southeastern USA, Caribbean, Southern Mexico	Exh. 14 - Maya Cocoa
11	Ericales	Sapotaceae	Chysophylloideae	<i>Bumelia celastrina (a/k/a Sideroxylon celastrinum)</i>	Saffron Plum	Florida, Texas, Central and South America	Exh. 5 - Ericales, Exh. 14 - Maya Cocoa
12,13	Sapindales	Burseraceae	N/A	<i>Bursera simaruba</i>	Gumbo-Limbo	Southeastern U.S., Mexico, Central America	Exh. 10 - Sapindales, Exh. 14 - Maya Cocoa
14	Canellales	Canellaceae	N/A	<i>Canella winterana</i>	Wild Cinnamon, Bahama White Bark	Florida Keys to Barbados	Exh. 9 - Basal Angiosperms
15	Lamiales	Lamiaceae	N/A	<i>Callicarpa americana</i>	American Beautyberry	Southern U.S.	N/A
16,17	Myrtales	Myrtaceae	Myrtoideae	<i>Calyptanthes pallens</i>	Spicewood	South Florida, Mexico to Costa Rica, Jamaica	Exh. 8 - Myrtales, Exh. 14 - Maya Cocoa
18	Myrtales	Myrtaceae	Myrtoideae	<i>Calyptanthes zuygium</i>	Myrtle-of-the-River	South Florida, Tropical America, Caribbean	Exh. 8 - Myrtales, Exh. 14 - Maya Cocoa
19	Brassicales	Capparaceae	Cleomoideae	<i>Capparis flexuosa</i>	Limber Caper	West Indies, Mexico, Central & South America	Exh. 14 - Maya Cocoa
20	Gentianales	Rubiaceae	Ixoroideae	<i>Casasia clusifolia</i>	Seven Year Apple	Florida, Caribbean	N/A
21	Rosales	Ulmaceae/Cannabaceae	N/A	<i>Celtis laevigata</i>	Hackberry	North America	Exh. 4 - Rosales
21a	Fabales	Fabaceae	Caesalpinioideae	<i>Chamaecrista deeringiana</i>	Deering Partridge Pea	Southeastern United States	Exh. 6 - Fabaceae
22	Ericales	Sapotaceae	Chysophylloideae	<i>Chrysophyllum oliviforme</i>	Satinleaf	Florida, Caribbean	Exh. 5 - Ericales
23	Lamiales	Verbenaceae	Verbenoideae	<i>Citharexylum spinosum (=fruticosum)</i>	Fiddlewood	West Indies, Northern SA, South Florida	N/A
24	Malpighiales	Clusiaceae	Clusioideae	<i>Clusia rosea</i>	Pitch apple	Florida, Caribbean, Cuba, Puerto Rico	Exh. 2 - Malpighiales
25	Rosales	Rhamnaceae	N/A	<i>Colubrina elliptica (= C. reclinata)</i>	Soldierwood	Florida, Caribbean, Central America	Exh. 4 - Rosales, Exh. 14 - Maya Cocoa
26	Lamiales	Boraginaceae	Cordioideae	<i>Cordia bahamensis</i>	Granny Bush, Bahama Manjack	South Florida, Bahamas, Cuba	N/A
27	Malpighiales	Euphorbiaceae	N/A	<i>Drypetes diversifolia</i>	Milkbark	South Florida	Exh. 2 - Malpighiales
28	Malpighiales	Euphorbiaceae	N/A	<i>Drypetes lateriflora</i>	Guania plum	South Florida, Bahamas, Greater Antilles, Mexico & Central America	Exh. 2 - Malpighiales, Exh. 14 - Maya Cocoa
28a	Gentianales	Rubiaceae	Cinchonoideae	<i>Erihalis fruticosa</i>	Black Torch	Florida and the Caribbean	N/A
29	Myrtales	Myrtaceae	Myrtoideae	<i>Eugenia auxillaris</i>	White Stopper	South Florida	Exh. 8 - Myrtales
30a, 30b	Myrtales	Myrtaceae	Myrtoideae	<i>Eugenia confusa</i>	Redberry Stopper	South Florida Hammocks	Exh. 8 - Myrtales
31	Myrtales	Myrtaceae	Myrtoideae	<i>Eugenia foetida</i>	Spanish Stopper	South Florida Hammocks, Caribbean	Exh. 8 - Myrtales
32	Myrtales	Myrtaceae	Myrtoideae	<i>Eugenia rhombea</i>	Red Stopper	South Florida Hammocks	Exh. 8 - Myrtales
33a, 33b, 33c	Sapindales	Sapindaceae	Dodonaeoideae	<i>Exothea paniculata</i>	Inkwood	S. FL, West Indies, Mexico and Central America	Exh. 10 - Sapindales, Exh. 14 - Maya Cocoa
34	Lamiales	Oleaceae	N/A	<i>Festiera segregata</i>	Florida Privet	South Florida	N/A
35, 36	Lamiales	Oleaceae	N/A	<i>Fraxinus caroliniana</i>	Pop Ash	South Florida	N/A
37, 38	Caryophyllales	Nyctaginaceae	N/A	<i>Guapira discolor</i>	Blolly	South Florida, Greater Antilles	N/A
39	Gentianales	Rubiaceae	Cinchonoideae	<i>Guettarda elliptica</i>	Hammock Velvetseed	South Florida	N/A
40	Malpighiales	Euphorbiaceae	Euphorbioideae	<i>Gymnanthes lucida (=Ateramnus)</i>	Crabwood	South Florida Hammocks	Exh. 2 - Malpighiales
41	Gentianales	Rubiaceae	Cinchonoideae	<i>Hamelia patens</i>	Firebush	American subtropics and tropics	Exh. 14 - Maya Cocoa
42, 43	Aquifoliales	Aquifoliaceae	N/A	<i>Ilex krugiana</i>	Tawny-berry Holly	Native-South Florida	N/A
43a	Rosales	Rhamnaceae	N/A	<i>Krugiodendron ferreum</i>	Black Ironwood	South Florida, Caribbean, Mexico	Exh. 4 - Rosales
43b	Ericales	Primulaceae	Theophrastoideae	<i>Jacquinia keyensis</i>	Joewood	Florida and the Caribbean	Exh. 4 - Rosales
43c	Lamiales	Verbenaceae	N/A	<i>Lantana depressa var. depressa</i>	Pineland Lantana	Endemic to Miami-Dade County	N/A
43d	Lamiales	Verbenaceae	N/A	<i>Lantana involucrata</i>	Buttonsage	S. Florida, Caribbean, Mexico and Central America	Ericales
44	Laurales	Lauraceae	Lauroideae	<i>Licaria triandra</i>	Gulf Licaria, Pepperwood	Florida, West Indies, Central America	Exh. 9 - Basal Angiosperms, Exh. 14 - Maya Cocoa
45b	Rosales	Moraceae	N/A	<i>Morus rubra</i>	Red Mulberry	Eastern US	Exh. 4 - Rosales
45c	Myrtales	Myrtaceae	Myrtoideae	<i>Mosiera longipes</i>	Longstalked Stopper, Mangroveberry	Southern Florida, Caribbean	Exh. 8 - Myrtales
46	Myrtales	Myrtaceae	Myrtoideae	<i>Myrcianthes fragrans</i>	Simpson's Stopper	Southern Mexico to Peru, West Indies, South Florida	Exh. 8 - Myrtales, Exh. 14 - Maya Cocoa
47	Fagales	Myricaceae	Myrtoideae	<i>Myrica cerifera</i>	Wax Myrtle	North America	NA
48, 49, 50	Laurales	Lauraceae	Lauroideae	<i>Nectandra canicea (=Ocotea)</i>	Lancewood	South Florida, Mexico to Honduras, WI	Exh. 9 - Basal Angiosperms, Exh. 14 - Maya Cocoa
50a	Sapindales	Simaroubaceae	NA	<i>Picramnia pentandra</i>	Bitterbush	Florida and the Caribbean, Venezuela and Colombia	Exh. 10 - Sapindales
51	Fabales	Fabaceae	Faboideae	<i>Piscidia piscipula</i>	Jamaica Dogwood	South Florida, WI, Belize, Guatemala	Exh. 6 - Fabaceae, Exh. 14 - Maya Cocoa
53	Caryophyllales	Nyctaginaceae	N/A	<i>Pisonia rotundata</i>	Smooth Devil's Claw	Florida, West Indies	N/A
54	Fabales	Fabaceae	Mimosoideae	<i>Pithecellobium keyense</i>	Florida Keys Blackbead	South FL, FL Keys, Cuba, Mexico	Exh. 6 - Fabaceae, Exh. 14 - Maya Cocoa
55	Rosales	Rosaceae	Amygaloideae	<i>Prunus myrtifolia</i>	West Indian Cherry	South Florida, Mexico, West Indies to Brazil	Exh. 4 - Rosales, Exh. 14 - Maya Cocoa
55a	Gentianales	Rubiaceae	Rubioidae	<i>Psychotria ligustrifolia (f/k/a Psychotria bahamensis)</i>	Bahama Wild Coffee	South Florida, the Bahamas and Caribbean	N/A
56	Gentianales	Rubiaceae	Rubioidae	<i>Psychotria nervosa</i>	Wild Coffee	Florida, Central America, South America	Exh. 14 - Maya Cocoa
57, 58, 59, 60, 61, 62	Fagales	Fagaceae	Quercuoideae	<i>Quercus virginiana</i>	Live Oak	Florida (probably not extreme southern FL), SE US; Texas	N/A
62a	Gentianales	Rubiaceae	Ixoroideae	<i>Randia aculeata</i>	White Indigoberry	Florida, Caribbean, Mexico, C. America and northern S. America	N/A
62b	Rosales	Rhamnaceae	N/A	<i>Reynosia septentrionalis</i>	Red Ironwood, Darlingplum	South Florida, Bahamas and Cuba	N/A
63, 64, 65	Arecales	Areaceae	Coryphoideae	<i>Sabal palmetto</i>	Sabal Palm, Cabbage Palm	South Carolina to South Florida, Bahamas	Exh. 1 - Areaceae, Exh. 14 - Maya Cocoa
65a	Lamiales	Nepetoideae	N/A	<i>Salvia coccinea</i>	Red Salvia	The Americas	NA
66	Celastrales	Celastraceae	N/A	<i>Schaefferia frutescens</i>	Florida-Boxwood	South Florida, Caribbean, Central and northern S. America	Exh. 14 - Maya Cocoa
66a	Fabales	Fabaceae	Caesalpinioideae	<i>Senna ligustrina</i>	Privet Senna	South Florida, West Indies and Central America	Exh. 6 - Fabaceae
67	Fabales	Fabaceae	Caesalpinioideae	<i>Senna mexicana var. chapmanii</i>	Bahama senna	South Florida, Bahamas & Cuba	Exh. 6 - Fabaceae
67a	Arecales	Areaceae	Coryphoideae	<i>Serona repens</i>	Saw Palmetto	Endemic to Southeastern United States	Exh. 1 - Areaceae
68	Ericales	Sapotaceae	Chysophylloideae	<i>Sideroxylon foetidissimum</i>	False Mastix	Florida, Caribbean, northern Central America, Mexico	Exh. 5 - Ericales, Exh. 14 - Maya Cocoa
68a	Ericales	Sapotaceae	Chysophylloideae	<i>Sideroxylon salicifolium</i>	Willow-Bustic	Southeastern United States, Mexico, the Caribbean, and Central America	Exh. 5 - Sapotaceae & other Ericales, Exh. 14 - Maya Cocoa
69, 70	Sapindales	Simaroubaceae	N/A	<i>Simarouba glauca</i>	Paradise Tree	Southern Florida, tropical S. America and Lesser Antilles	Exh. 10 - Sapindales, Exh. 14 - Maya Cocoa
71	Fabales	Fabaceae	Caesalpinioideae	<i>Sophora tomentosa</i>	Necklace Pod	Florida, Caribbean, S. America	Exh. 6 - Fabaceae
72	Sapindales	Meliaceae	Swietenioideae	<i>Swietenia mahagoni</i>	Mahogany	Florida, Caribbean	Exh. 10 - Sapindales
73	Pinales	Cupressaceae	Taxodioidae	<i>Taxodium distichum (= T. ascendens)</i>	Bald Cypress	Wetlands, SE US	Exh. 3 - Gymnosperms
73a	Myrtales	Melastomataceae	N/A	<i>Tetrazoigia bicolor</i>	Florida Clover Ash	South Florida, Caribbean	Exh. 8 - Myrtales
73b	Gentianales	Apocynaceae	N/A	<i>Vallesia antillana</i>	Pearlberry	S. Florida, Bahamas, Mexico	N/A
74	Cycladales	Zamiaceae	Zamiodeae	<i>Zamia integrifolia (=Zamia pumila)</i>	Coontie, Florida Arrowroot	Florida, Bahamas, Cuba, Hispanola	Exh. 3 - Gymnosperms

South Florida Native Species Planted in Other Gifford Arboretum Exhibits

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	Location
1	Arecales	Arecaceae	Coryphoideae	<i>Acoelorrhaphe wrightii</i>	Everglades Palm, Paurotis Palm	Native-South Florida Everglades, West Indies, Central America	Exh. 1 - Arecaceae
1 - 4	Arecales	Arecaceae	Coryphoideae	<i>Acoelorrhaphe wrightii</i>	Everglades Palm, Paurotis Palm	Native-South Florida Everglades, West Indies, Central America	Exh.14 - Maya Cocoa
2	Ericales	Primulaceae	Myrsinoideae	<i>Ardisia escalloniaoides</i>	Marlberry	Florida, Mexico, Guatemala, Belize, and Caribbean	Exh. 5 - Ericales
5	Malpighiales	Malpighiaceae	Byrsominoideae	<i>Byrsanima lucida</i>	Locust Berry	South Florida, West Indies	Exh. 2 - Malpighiales
5	Sapindales	Burseraceae	N/A	<i>Bursera simaruba</i>	Gumbo limbo	Southern Florida, Mexican, Caribbean, Brazil & Venezuela	Exh. 10 - Sapindales
101	Polypodiales	Polypodiaceae	Polypodioidae	<i>Campyloneurum phyllitidis</i>	Long Strap Fern	Florida, Central and South America, West Indies	Exh.14 - Maya Cocoa
11 - 17	Brassicales	Brassicaceae	Cleomoideae	<i>Capparis cynophallophora</i>	Jamaica Caper	Native- West Indies, Mexico, South Florida, FL Keys	Exh.14 - Maya Cocoa
102	Malpighiales	Chrysobalanaceae	N/A	<i>Chrysobalanus icaco</i>	Coco plum	Tropical Americas, Florida	Exh. 10 - Sapindales
104	Caryophyllales	Polygonaceae	Eriogonoideae	<i>Coccoloba diversifolia</i>	Pigeonplum, Doveplum	Coastal areas of Caribbean, Central America, Southern Mexico, South Florida	Exh. 10 - Sapindales
107	Caryophyllales	Polygonaceae	Eriogonoideae	<i>Coccoloba uvifera female</i>	Sea Grape	S FL Coastal Woodlands & Keys, Caribbean, Tropical America	Exh. 10 - Sapindales
16	Arecales	Arecaceae	Coryphoideae	<i>Coccothrinax argentea</i>	Silver Thatch Palm	Native-South Florida, southeast Mexico, the Bahamas and the Cayman Islands	Exh. 1 - Arecaceae
9	Malpighiales	Euphorbiaceae	Crotonoideae	<i>Croton linearis</i>	Pineland Croton	South Florida, Florida Keys and West Indies	Exh. 2 - Malpighiales
102	Lamiales	Verbenaceae	Verbenoideae	<i>Duranta erecta f/k/a Duranta repens</i>	Golden dewdrop, pigeonberry	Native-South Florida, West Indies, Central America to Brazil	Exh. 8 - Myrtales
25	Fabales	Fabaceae	Faboideae	<i>Erythrina herbacea</i>	Coral Bean, Cherokee Bean	South Florida, southern US, Mexico	Exh. 6 - Fabaceae
27	Rosales	Moraceae	Ficeae	<i>Ficus citrifolia</i>	Shortleaf Fig	Mexico, Belize, Guatemala to Panama; Native-South Florida, West Indies	Exh.14 - Maya Cocoa
28	Zygophyllales	Zygophyllaceae	Larreoideae	<i>Guaiacum sanctum</i>	Lignum-Vitae	South Florida, Bahamas and Central America	Exh. 13 -What is a tree
102	Gentianales	Rubiaceae	Cinchonoideae	<i>Hamelia patens</i>	Firebush	American tropics from Florida to Argentina	Exh. 11 - Malvales
102, 103	Gentianales	Rubiaceae	Cinchonoideae	<i>Hamelia patens</i>	Firebush	Native-South Fl Hammocks, WI, Mex, CA, SA	Exh. 9 - Basal Angiosperms
110, 111	Gentianales	Rubiaceae	Cinchonoideae	<i>Hamelia patens</i>	Firebush	American subtropics and tropics, FL	Exh. 10 - Sapindales
102	Gentianales	Rubiaceae	Cinchonoideae	<i>Hamelia patens</i>	Firebush	American tropics from Florida to Argentina	Exh. 11 - Malvales
106	Asterales	Asteraceae	Asteroideae	<i>Koanophyllon villosum</i>	Florida Shrub Thoroughwort, Shrub Eupatorium	Florida, West Indies	Exh. 5 - Ericales
25a	Arecales	Arecaceae	Coryphoideae	<i>Leucothrinax morrisii</i>	Key Thatch Palm	Florida Keys and Caribbean	Exh. 1 - Arecaceae
37 - 42	Myrtales	Myrtaceae	Myrtoideae	<i>Myrcianthes fragrans</i>	Simpson Stopper	Florida	Exh.14 - Maya Cocoa
29, 30, 31	Arecales	Arecaceae	Ceroxyloideae	<i>Pseudophaenix sargentii</i>	Buccaneer Palm	Florida, Yucatan, Cuba and Hispanola	Exh. 1 - Arecaceae
104	Fagales	Fagaceae	Quercoidaeae	<i>Quercus virginiana</i>	Live Oak	Native- Florida (maybe not extreme southern FL), SE US; Texas,	Exh. 8 - Myrtales
112	Fagales	Fagaceae	Quercoidaeae	<i>Quercus virginiana</i>	Live Oak	Florida, SE US, Texas	Exh. 10 - Sapindales
34, 35	Arecales	Arecaceae	Arecoideae	<i>Roystonea regia (-R. elata)</i>	Royal Palm	Native- Florida, United States & Cuba; Mexico, Belize, Honduras	Exh. 1 - Arecaceae
47 - 54	Arecales	Arecaceae	Coryphoideae	<i>Sabal palmetto</i>	Sabal Palm/Cabbage Palm	Native- South Carolina to South Florida, Bahamas	Exh.14 - Maya Cocoa
104	Sapindales	Meliaceae	Swietenioideae	<i>Swietenia mahagoni</i>	Caribbean Mahogany	South Florida and Caribbean	Exh. 2 - Malpighiales
50	Sapindales	Meliaceae	Swietenioideae	<i>Swietenia mahagoni</i>	Caribbean Mahogany	Native- Cape FL, FL Keys, Bahamas, West Indies	Exh. 13 -What is a tree
51	Sapindales	Meliaceae	Swietenioideae	<i>Swietenia mahagoni</i>	Caribbean Mahogany	Native- Cape FL, FL Keys, Bahamas, West Indies	Exh. 13 -What is a tree
57	Polypodiales	Dryopteridaceae	N/A	<i>Tectaria heracleifolia</i>	Broad Halbard fern	Florida, Tropical America	Exh.14 - Maya Cocoa
41, 42	Arecales	Arecaceae	Coryphoideae	<i>Thrinax radiata</i>	Florida Thatch Palm, Caribbean Thatch Palm	South Florida, Keys, Bahamas Islands, Central America, West Indies	Exh. 1 - Arecaceae
53	Sapindales	Rutaceae	Toddalioideae	<i>Zanthoxylum jagara</i>	Wild Lime	Florida, Texas, Mexico, C. America, S. America as far south as Paraguay	Exh. 13 -What is a tree

Non-Representative Species Planted in the South Florida Natives Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	G.A. Exhibit in which Non-Natives Species Belong, if any
100	Unplaced Euasterid	Incertae cedis	Boraginaceae	<i>Cordia sebestena</i>	Geiger Tree	West Indies, South America	N/A
101	Rosales	Rosaceae	Rosoideae	<i>Rubus niveus</i>	Mysore raspberry	Southern Asia, Taiwan and Philippines	Exh. 4 -Rosales
102	Fabales	Fabaceae	Papilionoideae	<i>Stongloydien macrobotrys</i>	Jade Vine	Phillipines	Exh 6 - Fabaceae

Exhibit 13 - What is a Tree?

That's a question each of us probably thinks we can answer almost instinctively. Images immediately come to mind, most likely of some old and massive, or very tall, tree that has meant something special to us. We probably also have positive feelings about trees as we have learned how they contribute to mankind by providing oxygen, food, shelter, heat, medicines, and aesthetic beauty. We may also know that they help prevent soil erosion, clean our air and water, and serve as "carbon sinks" by reducing carbon dioxide in the atmosphere and converting the carbon into their wood. But do we have a definition that is clear and decisive? Would your neighbors define "tree" in the same way that you do, or might it be analogous to Supreme Court Justice Potter Stewart who could not define pornography, but "knew it when he saw it"?

Actually, there is no universally agreed upon definition of "tree," even in a strictly botanical sense. While it is initially an issue of grouping plants with similar characteristics, it is ultimately a function of subjective criteria that change from context to context.

Usually, people think first of form and structure. A tree should be big, but certain species can vary dramatically in size in different environments. Bald cypress (*Taxodium distichum*) is one of Florida's largest and tallest residents, as well as its oldest. In Florida, they have been known to reach heights of 118 feet, with a trunk circumference of 425 inches, but they grow even bigger in some other states. Yet this same species is called 'dwarf cypress' in an area of Everglades National Park where they are stunted and often do not even reach 5 feet. Are they not also trees?

Some focus on the trunk, picturing a vertical piece of wood from which branches radiate. But must a plant have a main or central trunk to be properly classified as a tree? The *Jacaranda* and *Ficus* genera include species that tend to have multiple trunks, often of equal magnitude, yet most of us would consider them trees.

If we define "tree" as at least having a trunk made of wood, then some plants commonly referred to as "trees" do not qualify. For example, bananas (*Musa* species) are commonly called "trees," but their trunks contain nothing that could remotely be called wood. Not only is the substance inside a banana stalk soft and watery, but it consists of fiber that is not bound together like wood. Instead of strength derived from wood, the force that holds a banana stem erect is simply water pressure (called "turgor") inside the stem. Accordingly, bananas are botanically characterized as large herbs rather than trees. These plants lack lignin, which is the chemical that makes cellulose strong and hard to form wood.

However, there are also many plants that have very soft wood, but are generally considered to be trees. Example are the baobabs (*Adonsonia* species) and balsa (*Ochroma pyramidale*), both of which become very large trees. In particular, balsa wood is very soft and flexible, yet it is also one of the strongest woods in the world in terms of tensile strength.

If wood is a necessary component of trees, then how should "wood" be defined? Must it have growth rings like many dicots and conifers? But that is a phenomenon primarily of temperate trees. On the basis of wood characteristics, some argue that dicots and conifers are the only true trees. But what about palms? We commonly say "palm tree," yet the wood of palms

contains no rings even though some palms (like *Borassus* species) are valuable for timber.

Palms are monocots, but so are grasses, aloes, and lilies that we do not usually think of as trees. Yet some species within those groups should arguably be included as “trees” given their large size and strength. Those include Joshua trees (*Yucca brevifolia*), certain *Cordyline* species that grow quite large, and certain of the larger screw pines (*Pandanus* species), which can reach more than 35 feet tall.

While grasses are generally considered to be the opposite of trees, bamboo are grasses that can reach very large sizes and those are sometimes referred to as “trees.” *Bambusa oldhamii* is called the timber bamboo because its stems are both big and strong. Bamboo has been used in Japan for construction for eons and now we are also using bamboo flooring in this country.

Must plants have seeds to be trees? Tree ferns of the Southern Hemisphere can reach heights of more than 60 feet, but they reproduce through spores and don't consist of what most would consider wood. Are tree ferns like Australian tree fern (*Cyathea cooperi*) which you can see in the Arboretum, “trees”?

Should a “tree” be thought of only as a single organism? Especially in the tropics, certain trees can literally constitute an entire ecosystem as they support a network of other plants and animals. When trees provide favorable conditions for life by other species, they are called “keystone” species. Yet trees are often also dependent on other species. Most trees could not live without other cooperative species with which they have mutually advantageous relations. Nature is full of evolutionary co-dependencies in which particular tree species requires one particular pollinator to reproduce (for example, *Ficus* species). Many trees are also dependent on animals for seed dispersal. Although wind pollinated, oaks and pines are known to be particularly dependent on mycorrhizae, a soil-borne fungi that significantly increases the absorptive area and efficiency of a tree's roots. A single fungal mycelium may extend for acres and also may interact with many plants of different species. Are these linked organisms a tree or many trees? Species evolution can certainly be described as a strange but fascinating mix of collaborations as well as competitions!

While there is no universally accepted definition of a “tree,” we invite you to explore the many “trees” in the Gifford Arboretum and to consider the diverse and important roles that they play in our lives.

Some interesting information about trees:

Most tropical trees are pollinated by animals (and therefore generally have larger, more colorful and/or scented flowers), while temperate trees are predominantly wind pollinated (and therefore have smaller, inconspicuous flowers with large quantities of pollen).

Generally, colorful flowers attract daytime pollinators, while white flowers attract nighttime pollinators. Red and purple flowers have been observed to attract most butterflies, while white

flowers are generally more attractive to moths.

Flower fragrances are often associated with night pollinators, and some of their scents may be unpleasant to our sensibilities. But bats and other night creatures love them!

Honey bees, which are generalist pollinators, tend to focus on one particular plant species at a time rather than multiple species. This is why we get orange blossom and mangrove honeys in Florida, and sourwood and poplar honeys in North Carolina. But it certainly helps that the flowering seasons of these plants are generally distinct.

Trees react more to the length of night than to the amount of daylight or changes in temperature when adjusting to changes of season. Young leaves tend to have the highest amounts of nitrogen, and trees withdraw nitrogen from the leaves before shedding them in the fall.

Trees that evolve in open, windy areas tend to have thicker trunks and to be sturdier than forest trees. Strong winds will often topple giant, but shallow-rooted, trees of the Amazon rainforest.

Tree diversity is greatest in the tropics. For example, India has approximately 4,500 native tree species. In contrast, Canada has only 9 predominant native species of trees, consisting of certain conifers (mostly members of the Pinaceae family) and the quaking aspen (*Populus tremuloides*). The continental United States has approximately 620 species of native trees. However, in 37 acres of the Manu National Park in Peru, scientists identified 825 species of trees, which is significantly more native tree species than in all of Canada and the continental United States combined.

Trees growing closer to the North and South poles tend to be the tallest, a growth pattern that evolved to maximize the amounts of sunlight the trees receive and photosynthesis. Examples are the *Eucalyptus* species of Australia and the giant firs and spruces of the Northern Hemisphere (which also evolved in shapes that help them shed falling snow).

Trees with broad, spreading canopies tend to grow closer to the equator where the sunlight is generally more directly overhead. However, trees of the Amazon tend to grow straight up as a result of growing in a crowd. Many diverse factors are involved in how trees evolve in shape and size.

The leaves of dicots grow out from the edges, while the leaves of monocots grow from the bottom up. Also, most monocots do not undergo secondary thickening of their trunks. Thus, most palms will forever have the same trunk thickness from the ground up. One exception is the *Lantania* species, which have characteristic swollen bases.

The tallest trees are the coastal redwoods (*Sequoia sempervirens*) of California, with heights of more than 370 feet. The tallest flowering tree, *Eucalyptus regnans*, is found in New South Wales, Victoria and Tasmania, Australia, with the champion tree growing to 327 feet tall in the interior of Tasmania.

The oldest trees in the world are bristlecone pines (*Pinus longaeva*), at more than 4,000 years old,

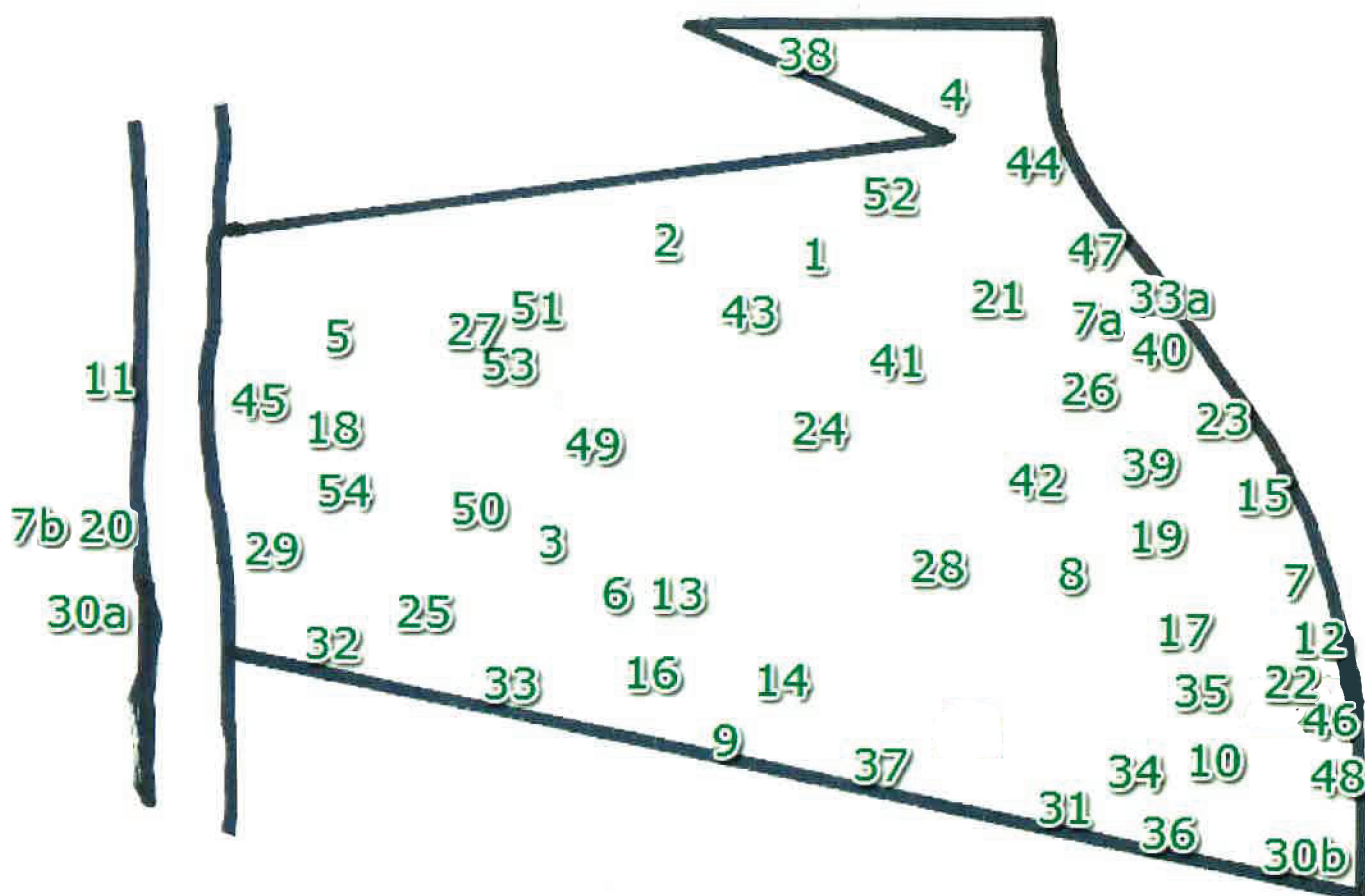
and the most massive trees are the giant sequoias (*Sequoiadendron giganteum*), both of which species are now endemic to the Sierra Nevada mountain range of eastern California although their earlier ranges were much larger.

Most trees acquire water predominantly from the ground through their roots. But the giant coastal redwoods derive approximately one-third of their water through their leaves from the mists in which they live.

Modern estimates count approximately 350,000 species of land plants, and at least 300,000 of them are flowering plants. Using simple criteria, it is estimated that about a fifth of the flowering plants are trees, and adding the approximately 630 species of conifers, it is estimated that about 60,000 species of trees exist in the world. But those numbers vary significantly with changes in the subjectively selected criteria of treedom. Another reason that it is difficult to state the number of tree species exactly is that there are thousands of hybrids, some natural, but many created by humans.

In 1997, the Kyoto Protocol called for reductions in carbon emissions to levels that were 5% below those produced in 1990. In spite of this goal, the Global Carbon Project recently reported that carbon emission levels have risen 49% during the last two decades. Besides serving as stores of carbon, trees are critical to our future in so many ways, and the need for good stewardship of Mother Earth has never been greater.

Exhibit 13 – What is a Tree?



- | | | |
|---------------------------------------|-------------------------------------|-----------------------------------|
| 1 <i>Adansonia grandidieri</i> | 18 <i>Costus</i> sp. | 36 <i>Musa accuminata</i> |
| 2 <i>Alluadia procera</i> | 19 <i>Cubanola domigensis</i> | 'Nino' |
| 3 <i>Alocasia macrorrhizos</i> | 20 <i>Cyathea cooperi</i> | 37 <i>Musa acuminata</i> ssp. |
| 4 <i>Aloe ferox</i> | 21 <i>Dasyilirion longissimum</i> | <i>Zebrina</i> |
| 5 <i>Alpinia galangal</i> | 22 <i>Datura metel</i> | 38 <i>Ochna serulata</i> |
| 6 <i>Amorphophallus bulbifer</i> | 23 <i>Delonix pumila</i> | 39 <i>Opuntia ficus-indica</i> |
| 7 <i>Amorphophallus paeoniifolius</i> | 24 <i>Dovyalis caffra</i> | 40 <i>Oxyceros horridus</i> |
| 7a <i>Anastraphia ilicifolia</i> | 25 <i>Encephalartos ferox</i> | 41 <i>Pachypodium geayei</i> |
| 7b <i>Anthurium</i> sp. | 26 <i>Euphorbia leucodendron</i> | 42 <i>Pandanus tectorius</i> |
| 8 <i>Aristolochia philippiensis</i> | 27 <i>Gmelina philippensis</i> | 43 <i>Phyllanthus arbuscula</i> |
| * 8a <i>Asclepias curassavica</i> | 28 <i>Guaiacum sanctum</i> | 44 <i>Posoqueria latifolia</i> |
| 9 <i>Bambusa oldhamii</i> | 29 <i>Hedychium coronarium</i> | 45 <i>Ruscus hypoglossum</i> |
| 10 <i>Bambusa vulgaris</i> | 30a-b <i>Heliconia caribaea</i> | 46 <i>Saccharum</i> sp. |
| 11 <i>Begonia</i> sp. | 31 <i>Heliconia caribaea</i> | 48 <i>Solanum wrightii</i> |
| 12 <i>Brugmansia aurea</i> | 32 <i>Heliconia pendula</i> | 49 <i>Strelitzia nicolai</i> |
| 13 <i>Brunfelsia lactea</i> | 33 <i>Heliconia rostrata</i> | 50,51 <i>Swietenia mahagoni</i> |
| 14 <i>Carludovica palmata</i> | 33a <i>Hylocereus guatamalensis</i> | 52 <i>Trichocereus peruvianus</i> |
| 15 <i>Cereus peruvianus</i> | 34 <i>Jatropha curcus</i> | 53 <i>Zanthoxylum fagara</i> |
| 16 <i>Coffea Arabica</i> | 35 <i>Morinda citrifolia</i> | 54 <i>Zingiber officinale</i> |
| 17 <i>Cordyline mauritiana</i> | | |

What is a Tree? Exhibit

Exhibit 13 - Color Code =

Species Planted in the What is a Tree? Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin	Other G.A. Exhibit in which Species also Belongs, if any
1	Malvales	Malvaceae	Bombacoideae	<i>Adansonia grandidieri</i>	Giant Baobab	Madagascar	Exh. 11 - Malvales
2	Caryophyllales	Didiereaceae	Didiereoideae	<i>Alluadia procera</i>	Madagascar Ocotillo	Madagascar	N/A
3	Alismatales	Araceae	Aroideae	<i>Alocasia macrorrhizos</i>	Elephant Ear	Malaysia to Queensland	N/A
4	Asparagales	Xanthorrhoeaceae	Asphodeloideae	<i>Aloe ferox</i>	Cape Aloe, Tree Aloe	South Africa	N/A
5	Zingiberales	Zingiberaceae	Alpinioideae	<i>Alpinia galanga</i>	Greater Galangal	SE Asia	N/A
6	Alismatales	Araceae	Aroideae	<i>Amorphophallus bulbifer</i>	Voodoo Lilly	Southeast Asia, Lower Himalayas of India and Myanmar	N/A
7	Alismatales	Araceae	Aroideae	<i>Amorphophallus paeoniifolius</i>	Elephant Foot Yam	Southeast Asia	N/A
7a	Asterales	Asteraceae	Gochnatioideae	<i>Anastrophia ilicifolia a/k/a Gochnatia ilicifolia</i>	N/A	Cuba	N/A
7b	Alismatales	Araceae	N/A	<i>Anthurium sp.</i>	Bird's Nest Anthurium	Central and South America	N/A
8	Piperiales	Aristolochiaceae	Aristolochioideae	<i>Aristolochia philippiensis</i>	N/A	Philippines	Exh. 9 - Basal Angiosperms
8a	Gentianales	Apocynaceae	Asclepiadoideae	<i>Asclepias curassavica</i>	Scarlet milkweed	The Americas	N/A
9	Poales	Poaceae	Bambusoideae	<i>Bambusa oldhamii</i>	Timber Bamboo, Ryoku-chiku	China, Taiwan	N/A
10	Poales	Poaceae	Bambusoideae	<i>Bambusa vulgaris 'Wamin'</i>	Dwarf Buddha's Belly Bamboo	Only in cultivation; Wild type from tropical Asia.	N/A
11	Cucurbitales	Begoniaceae	N/A	<i>Begonia sp.</i>	White Begonia	Pantropical	N/A
12	Solanales	Solanaceae	Solanoideae	<i>Brugmansia aurea</i>	Yellow Angel's Trumpet	Northern Andes Mtns.	N/A
13	Solanales	Solanaceae	Cestroideae	<i>Brunfelsia lactea</i>	Lady of the Night	Puerto Rico	N/A
14	Pandanales	Cyclanthaceae	Carludovicoideae	<i>Carludovica palmata</i>	Panama Hat	Guatemala south to Bolivia	N/A
15	Caryophyllales	Cactaceae	Cactoideae	<i>Cereus peruvianus</i>	Peruvian Apple	Argentina, Brazil & Peru	N/A
16	Gentianales	Rubiaceae	Ixoroideae	<i>Coffea arabica</i>	Coffee	Ethiopia	N/A
17	Asparagales	Ruscaceae	N/A	<i>Cordyline mauritiana (= Dracaena mauritiana)</i>	N/A	Mascarenes, Mauritius	N/A
18	Zingiberales	Costaceae	N/A	<i>Costus sp.</i>	Spiral Ginger	Pantropical	Exh. 14 - Maya Cocoa
19	Gentianales	Rubiaceae	Cinchonoideae	<i>Cubanola damigenis</i>	Campanita	Dominican Republic	N/A
20	Filicales	Cyatheaceae	N/A	<i>Cyathea cooperi</i>	Australian Tree Fern	New South Wales and Queensland, Australia	N/A
21	Asparagales	Ruscaceae	N/A	<i>Dasyllirion longissimum (= Dasyllirion quadrangulatum)</i>	Mexican Grass Tree, Toothless Sotol	Chihuahuan Desert and other xeric parts of NE Mexico	N/A
22	Solanales	Solanaceae	Solanoideae	<i>Datura metel var fastuosa</i>	Devil's Trumpet, Sacred Datura	China, India, SE Asia	N/A
23	Fabales	Fabaceae	Caesalpinioideae	<i>Delonix pumila</i>	Dwarf Flamboyant	Madagascar endemic	Exh. 6-Fabaceae
24	Malpighiales	Salicaceae	N/A	<i>Dovyalis caffra</i>	Kei Apple	Africa	Exh. 2 -Malpighiales
25	Cycadales	Zamiaceae	Encephalartoideae	<i>Encephalartos ferox</i>	Tongaland Broodboom	Southern-east coast of Africa	Exh. 3 – Gymnosperms
26	Malpighiales	Euphorbiaceae	Euphorbioideae	<i>Euphorbia leucodendron</i>	Stick Plant	Madagascar	Exh.2- Malpighiales
27	Lamiales	Lamiaceae	Viticoideae	<i>Gmelina philippensis</i>	Parrot's Beak	Philippines, SE Asia, India	N/A
28	Zygophyllales	Zygophyllaceae	Larreoideae	<i>Guaicum sanctum</i>	Lignum-Vitae	South Florida, Bahamas and Central America	Exh. 12 -South Florida Natives, Exh. 14 - Maya Cocoa
29	Zingiberales	Zingiberaceae	Zingiberoideae	<i>Hedychium coronarium</i>	White Ginger	S & SE Asia	N/A
30a	Zingiberales	Heliconiaceae	N/A	<i>Heliconia caribaea x H. bihai</i>	Probably cv. Jacquini	Caribbean and Northern S. America	N/A
30b	Zingiberales	Heliconiaceae	N/A	<i>Heliconia caribaea x H. bihai</i>	Probably cv. Jacquini	Caribbean and Northern S. America	N/A
31	Zingiberales	Heliconiaceae	N/A	<i>Heliconia caribaea x H. bihai cv. Criswick</i>	N/A	Caribbean and Northern S. America	N/A
32	Zingiberales	Heliconiaceae	N/A	<i>Heliconia pendula cv. Bright Red</i>	N/A	N. South America and S. Central America	Exh. 14 - Maya Cocoa
33	Zingiberales	Heliconiaceae	N/A	<i>Heliconia rostrata</i>	Lobster Claw	Columbia, Ecuador, Peru	N/A
33a	Caryophyllales	Cactaceae	Cactoideae	<i>Hylocereus costaricensis</i>	Red Pitahaya/Red Dragon Fruit cv. "Hylocereus guatemalensis"	Guatemala	NA
34	Malpighiales	Euphorbiaceae	Crotonoideae	<i>Jatropha curcus</i>	Barbados Nut, Purging Nut, Physic Nut	Mexico and Central America	Exh. 2 - Malpighiales, Exh. 14 - Maya Cocoa
35	Gentianales	Rubiaceae	Rubioideae	<i>Morinda citrifolia</i>	Noni	SE Asia	N/A
36	Zingiberales	Musaceae	N/A	<i>Musa accuminata 'Nino'</i>	Lady Finger Banana	Southeast Asia	N/A
37	Zingiberales	Musaceae	N/A	<i>Musa accuminata ssp. Zebrina</i>	Blood Banana	Indonesia	N/A
38	Malpighiales	Ochnaceae	Ochnoideae	<i>Ochna serulata</i>	Mickey Mouse Bush	South Africa	Exh. 2 - Malpighiales
39	Caryophyllales	Cactaceae	Opuntioideae	<i>Opuntia ficus-indica</i>	Tuna, Barbary Fig, Prickly Pear	Mexico	Exh. 14 - Maya Cocoa
40	Gentianales	Rubiaceae	Ixoroideae	<i>Oxyceros horridus (= Randia siamensis)</i>	Fragrant Randia, Kud Kauw, Wait-a-bit	Thailand	N/A
41	Gentianales	Apocynaceae	Apocynoideae	<i>Pachypodium gageyi</i>	Madagascar Palm	Madagascar	N/A
42	Pandanales	Pandanaceae	Pandanoideae	<i>Pandanus tectorius</i>	Screwpine	Indonesia, E. Australia, Pacific Islands, Malaysia	N/A
43	Malpighiales	Phyllanthaceae	N/A	<i>Phyllanthus arbuscula</i>	N/A	Endemic to Jamaica	Exh. 2 - Malpighiales
44	Gentianales	Rubiaceae	Ixoroideae	<i>Posoqueria latifolia</i>	Needle Flower Tree, Jazmin De Embarcadero	Mexico to N. South America	Exh. 14 - Maya Cocoa
45	Asparagales	Ruscaceae	N/A	<i>Ruscus hypoglossum</i>	Mouse Thorn, Spineless Butcher's Broom	Western Europe, Iran	N/A
46	Poales	Poaceae	Panicoideae	<i>Saccharum ssp.</i>	Sugarcane	Tropical south and southeast Asia	N/A
48	Solanales	Solanaceae	Solanoideae	<i>Solanum wrightii (= S. macranthum)</i>	Giant Potato Tree	Brazil	N/A
49	Zingiberales	Strelitziaceae	N/A	<i>Strelitzia nicotai</i>	White Bird of Paradise	Eastern S. Africa, Mozambique, Botswana & Zimbabwe	N/A
50	Sapindales	Meliaceae	Swietenioideae	<i>Swietenia mahagoni</i>	Caribbean Mahogany	Native- Cape FL, FL Keys, Bahamas, West Indies	Exh. 10 - Sapindales, Exh. 12 - South Florida Natives
51	Sapindales	Meliaceae	Swietenioideae	<i>Swietenia mahagoni</i>	Caribbean Mahogany	Native- Cape FL, FL Keys, Bahamas, West Indies	Exh. 10 - Sapindales, Exh. 12 - South Florida Natives
52	Caryophyllales	Cactaceae	Cactoideae	<i>Trichocereus peruvianus = Echinopsis peruviana</i>	Peruvian Torch	Peru: W slope of Andes	N/A
53	Sapindales	Rutaceae	Toddalioideae	<i>Zanthoxylum fagara</i>	Wild Lime	Florida, Texas, Mexico, C. America, S. America as far south as Paraguay	Exh. 10 - Sapindales, Exh. 12 - South Florida Natives
54	Zingiberales	Zingiberaceae	Zingiberoideae	<i>Zingiber officinale</i>	Ginger	South Asia	N/A

Exhibit 14 - Maya Cocoa Garden

The Mayan civilization's beginnings and end are the subject to much speculation and debate. However, we know that this civilization reached its zenith during the 6th through 9th centuries AD, and that it had developed advanced knowledge of mathematics, writing, and astronomy. The Mayans were one of the earliest people to understand the concept of zero, and their calendar was so advanced that it is almost exactly what is in use today. While the Maya world spread throughout Mesoamerica (southern Mexico and most of Central America), its beginnings were in Guatemala. The grand and impressive ruins of Tikal are a vivid reminder of their advanced architecture and building methods, as well as their advanced understanding of astronomy.

But why maintain a "Maya Cocoa Garden" in our Arboretum? It is because of the integral parts that trees played in the lives of the Mayans. They felt a kinship with the natural world, and trees were important parts of their religion and culture. Indeed, a tree was the symbol for the Mayan concept of life, and they showed good insight into evolution, believing that the Creator had made plants before making the animals or man.

While the Mayans utilized many trees growing in the diverse ecosystems that constituted the Mayan world, no species was of more religious or social significance than the giant ceiba or kapok (*Ceiba pentandra*). The Mayans believed that the kapok tree symbolized the universe, with the underworld lords of darkness dwelling in the roots, while the Heart of Sky (the good deities) resided in the canopy and above. Its massive, straight trunk ("Wacah Chan") constituted the pillar that sustained the universe. Today, *Ceiba pentandra* is the national tree of Guatemala and its lightweight wood continues to be employed in some of the same ways that the Mayans did. Those include using the wood in canoe and boat building, and extracting oil from the seeds that can be used in cooking, in lamps, and in the manufacture of glue and soap. Of course, the work "kapok" also refers to the cotton-like substance found inside the seed pod. It has been widely used for stuffing and padding even though its biological role was simply for seed dispersal. The tree also had some medicinal uses. The oldest documented *Ceiba pentandra* is 450 years old and grows in Amatitlan, Guatemala. It was planted by an early missionary named Brother Domingo Martinez.

Given that the land of the Mayans contained mountains with significant changes in altitude as well as water availability, there was inherently a rich biodiversity of plants and animals in Mayan life. Some of their most important trees were native pines and a cypress (*Cupressus lusitannica*) that inhabited the mountainous areas. There was even a tropical fir (*Abies guatemalensis*) living in the high cloud forests! While we cannot replicate those living conditions in South Florida, it would be wrong to conceive of the Mayan world as only consisting of the trees better suited for the bottom lands, many of which can be grown here.

One of the important functions of trees in the Mayan world was for nourishment. While maize was the most important staple in their diets, probably the next most important sustenance plant for the Mayans was ramon or bread nut (*Brosimum alicastrum*). This tall, beautiful tree of the tropical forests has long pendulous branches that produce many small, round fruit. Although its use as food is rare today, these fruit were widely eaten by the Mayan people, including being ground into a substitute flour for tortillas when corn was scarce. Today, its leaves, stems and seeds continue to be used as animal fodder. The seeds are particularly rich in protein, amino acids and vitamin C, and they can be roasted to prepare a drink similar to chocolate. As in the past, *Brosimum alicastrum* wood is valued for construction and the manufacture of furniture, decorative items, and bowls.

Undoubtedly, the most renowned food tree of the Mayans was *Theobroma cacao*, the source of chocolate. Early evidence of cacao use goes back to 1900 BC, and its earliest uses most likely involved fermentation and making alcoholic beverages. While the Mayans continued that use, they also developed various ways to prepare chocolate from the seeds or “beans.” They also used the pulp around the seeds to prepare juices and in cooking. Cacao was so important to the Mayans that they even used the beans as a form of money for exchange. Today, oil extracted from the seeds is sometimes used in cosmetics, perfumes and medicines.

Another important food tree of the Mayans was *Manilkara zapota* (sapodilla), which was not only eaten as a fruit, but its milky sap, called “chicle”, became an early Mayan chewing gum as well as the original basis for the modern chewing gum industry. *Manilkara zapota* wood was also used for construction, particularly for temples and larger buildings, and its seeds and bark were thought to have medicinal properties.

Other food trees included *Pouteria sapote* (mamey), which was valued for its fruit and wood; *Pachira aquatica* (Guiana chestnut), whose seeds were eaten and used to produce oil; and *Byrsonima crassifolia* (nance), a wild cherry mentioned in the Popul Vuh whose wood was also valued and an infusion of its bark was believed to cure snakebite and lung problems. Although imported, *Inga edulis* (ice cream bean) from S. America, and *Melicoccus bijugatus* (Spanish lime, mamoncillo, or guinep) from northern S. America, were believed to have been consumed by the Mayans as well.

Although the origins of *Carica papaya* (papaya) remain a mystery, early evidence of it has been found in Mexico and it appears very likely that it was a food of the Mayans. Similarly, *Cnidoscolus aconitifolius* (chaya or tree spinach) is believed to have originated in the Yucatan portion of Mexico and it is likely that it was also eaten by the Mayans. Finally, the Mayans were early propagators of Cayenne peppers, yams and new world spices. The native, vine-like orchid, *Vanilla planifolia*, was propagated and consumed by the Mayans, including as a flavoring for chocolate drinks. Chili was also an early flavoring for chocolate.

Trees were utilized by the Mayans for many other purposes. *Swietenia macrophylla* (big leaf mahogany) was predominantly valued for its wood, but its seeds and bark were also used medicinally to lower fevers and to help stop diarrhea. *Enterolobium cyclocarpum* (guanacaste or ear tree) was valued for its wood, which is water resistant, as well as for its edible seeds; seed pods that can be a soap substitute; and sap that was believed to have medicinal properties. *Cedrela odorata* (cedro or Spanish cedar) was valued in construction for its wood, and teas made from its leaves, roots and bark were used to fight bronchitis, nausea, and epilepsy. Its seeds were thought to eliminate intestinal parasites.

The Mayans also appreciated that certain members of the Fabaceae family had nitrogen fixing properties that help with the cultivation of other plants and grasses. Although an invasive pest in many areas, including Florida, *Leucaena leucocephala* (leadtree) was popular with the Mayans not only because it improved grass and other crops in the area, but also for its dense wood. Another legume, *Gliricidia sepium* (madre de cacao) became a favorite because its shade and nitrogen fixing properties were beneficial in cacao farming. Its foliage was also valued as a “green manure” for fertilizer, and as animal fodder. *Gliricidia sepium* flowers are edible, and its leaves were believed to have medicinal properties. However, its seeds and roots are poisonous and have been used as an effective rodenticide. *Erythrina berteroana* (called the whistle tree because its petals can be used for a whistle) was not only planted as a boundary marker, but it was believed to be an ingredient in the creation of man. Its foliage was used as fodder and its flowers, leaves and young shoots are reputed to be delicious in soups and sauces. Again, however, its seeds and roots are poisonous and were utilized in organic insecticides and rodenticides. Another Legume used by the Mayans was *Haematoxylum campechianum* (palo de tinta or logwood). It was not used so much for nitrogen fixing as a source of haematoxylin, a dye for wool whose use later spread to Europe. The Mayans also appreciated it for its strong, aromatic and beautiful wood, and for medicinal properties. It is still used today as an astringent and to treat dysentery and diarrhea.

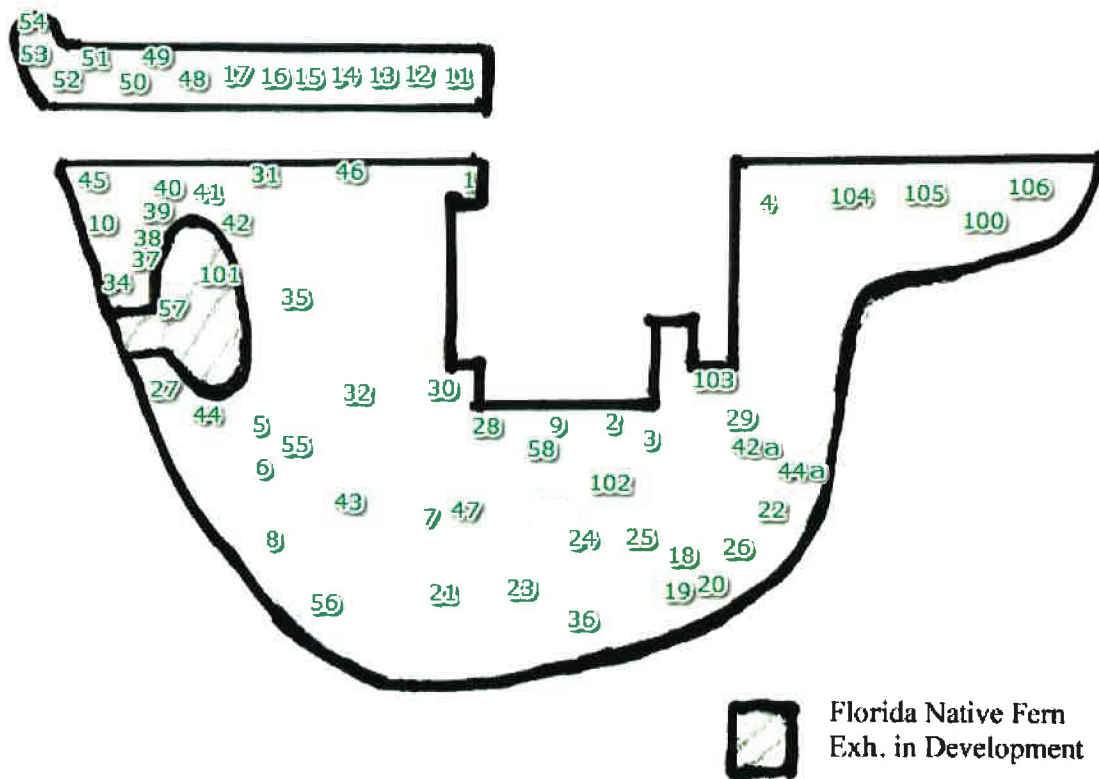
Although *Cocos nucifera* (coconut) may have been introduced after the decline of the Mayan civilization, other palms were clearly utilized by the Mayans. *Sabal mexicana* was used for thatch as well as for harvesting heart of palm for food. *Attalea cohune* (American Oil Palm), a large, majestic palm that produces abundant fruit, was also valued. It was not only used for construction, but its edible fruit were eaten raw and its seeds were used to produce cohune oil for cooking and soap making.

No discussion of Mayan plants would be complete without *Crescentia cujute* (Calabash). Not only was the wood of value and the inside of the fruit used for sweets and drinks as well as medicinal properties, but the outer shells of dried fruits found a host of uses for everything from bowls and cups to maracas and other musical instruments. Decorative designs were created by a combination of applying scale insects and/or soot to the fruits as they were growing, as well as by carving the dried fruit.

Finally, it is interesting to note that two of our Florida native trees were also native to the Mayan area and were greatly appreciated by them. First, *Guaiacum sanctum* (Lignum Vitae) was not only valued and used for its hard, strong wood, but also as a medicinal plant. Its resin was used as a stimulant, laxative and diuretic, and it was even applied as a pain remedy for aching teeth. While it was believed for many years to also be a remedy for venereal disease, there is scant modern evidence of its effectiveness in that regard.

Another common Florida tree, *Bursera simaruba* (Gumbo Limbo) was also native to the Mayan areas. Its soft wood was valued for various uses, and its resin was used to produce a varnish for boats as well as incense and a glue to repair pottery. It also had medicinal uses as a laxative, diuretic, and an antidote for snakebite. Finally, the leaves were used as a poultice that was believed to help reduce the spread of gangrene.

Exhibit 14 – Maya Cocoa Garden



1-4 *Acoelorrhaphe wrightii*
 5, 6 *Agave weberi*
 7 *Ardisia revoluta*
 8 *Attalea cohune*
 9 *Brosimum alicastrum*
 10 *Bucida spinosa*
 11-17 *Capparis cynophallophora*
 18-20 *Carica papaya*
 21 *Ceiba pentandra*
 22 *Cnidioscolus aconitifolius*
 23-26 *Cocos nucifera*
 27 *Ficus citrifolia*
 28 *Galphimia gracilis*

29 *Gliricidia sepium*
 30 *Guazuma ulmifolia*
 31 *Haematoxylum campechianum*
 32, 33 *Inga edulis*
 34 *Juanulloa mexicana*
 35 *Manilkara zapota*
 36 *Melicococcus bijugatus*
 37-42 *Myrcianthes fragrans*
 42a *Montanoa bipinnaifida*
 43 *Pachira aquatica*
 44 *Pithecellobium sp.*
 44a *Phymosia umbellata*
 45 *Plumeria rubra*

46 *Quararibea funebris*
 47-54 *Sabal palmetto*
 55 *Sabal yapa*
 56 *Swietenia macrophylla*
 57 *Tectaria heracleifolia*
 58 *Vanilla planifolia*

Non-Maya Cocoa Garden

100 *Bismarckia nobilis*
 101 *Campyloneurum phyllitidis*
 102 *Dillenia indica*
 103 *Myristica fragrans*
 104-106 *Psidium cattleianum*

The Maya Cocoa Garden Exhibit
Exhibit 14 - Color Code

Representative Species Planted in the Maya Cocoa Garden Exhibit

Identification Number	Order	Family	Subfamily	Genus & Species	Common Name	Area of Origin/Distribution	G.A. Exhibit in which Representative Species Also Belongs, if any
1 - 4	Arecales	Arecaceae	Coryphoideae	<i>Acoelorrhaphe wrightii</i>	Everglades Palm, Paurotis Palm	Native-South Florida Everglades, West Indies, Central America	Exh. 1 - Arecaceae, Exh. 12- South Florida Natives
5, 6	Asperagales	Asparagaceae	Agavoideae	<i>Agave weberi</i>	Maguery liso	Northeastern Mexico	N/A
7	Ericales	Primulaceae	Myrsinoideae	<i>Ardisia revoluta</i>	Tucuico	Mexico, Central America	Exh. 5 - Ericales
8	Arecales	Arecaceae	Arecoideae	<i>Attalea cohune</i>	American Oil Palm, Cohune Palm	Mexico, Central America	Exh. 1 - Arecaceae
9	Rosales	Moraceae	N/A	<i>Brosimum alicastrum</i>	Mayan breadnut, Chak óox, Ramón, Capomo	Tropical America	Exh.4 - Rosales
10	Myrtales	Combretaceae	N/A	<i>Bucida spinosa</i>	Júcaro Espinoso, Dwarf black olive, Ming tree	Mexico: Yucatan, West Indies	Exh. 8 - Myrtales
11 - 17	Brassicales	Brassicaceae	Cleomoideae	<i>Capparis cynophallophora</i>	Jamaica Caper	Native- West Indies, Mexico, South Florida, FL Keys	Exh. 12 - South Florida Natives
18 - 20	Brassicales	Caricaceae	N/A	<i>Carica papaya</i>	Papaya, pawpaw	Tropical America	N/A
21	Malvales	Malvaceae	Bombacoideae	<i>Ceiba pentandra</i>	Giant Kapok, Yáaxche'	Mexico to South America (cultivated pan-tropically)	Exh. 11 - Malvales
22	Malpighiales	Euphorbiaceae	Crotonoideae	<i>Cnidocolus aconitifolius</i>	Mayan Tree Spinach	Mexico to Brazil	Exh. 2 - Malpighiales
23 - 26	Arecales	Arecaceae	Arecoideae	<i>Cocos nucifera</i>	Coconut Palm	Pantropical (Naturalized)	Exh. 1 - Arecaceae
27	Rosales	Moraceae	Ficeae	<i>Ficus citrifolia</i>	Shortleaf Fig	Mexico, Belize, Guatemala to Panama; Native-South Florida, West Indies	Exh. 4 -Rosales, Exh 12. - South Florida Natives
28	Malpighiales	Malpighiaceae	Byrsonimoideae	<i>Galphimia gracilis</i>	Thrysalis, Spray of Gold	Eastern Mexico	Exh. 2 - Malpighiales
29	Fabales	Fabaceae	Faboideae	<i>Gliricidia sepium</i>	Madrede Cacao	Mexico and Central America	Exh. 6 - Fabaceae
30	Malvales	Malvaceae	Byttnerioideae	<i>Guazuma ulmifolia</i>	Mutamba, guácimo	Mexico, West Indies, Central & S America	Exh. 11 - Malvales
31	Fabales	Fabaceae	Caesalpinioideae	<i>Haematoxylum campechianum</i>	Logwood, bloodwoodtree, spiny tree, uitzquaitl, huitzcuahuitl	Mexico: Yucatan; Belize, Honduras	Exh. 6 - Fabaceae
32, 33	Fabales	Fabaceae	Mimosoideae	<i>Inga edulis</i>	Ice cream bean	Central and South America	Exh. 6 - Fabaceae
34	Solanales	Solanaceae	Solanoideae	<i>Juanulloa mexicana</i>	Gold finger	Mexico (Petén Basin) to Colombia, Ecuador, and Peru	N/A
35	Ericales	Sapotaceae	Sapotoideae	<i>Manilkara zapota</i>	Sapodilla, Nispero, Ya'		Exh. 5 - Ericales
36	Sapindales	Sapindaceae	Sapindoideae	<i>Melicoccus bijugatus</i>	Spanish Lime, Mamoncillo, Ganep	Central America, Caribbean, Columbia, Venezuela.	Exh. 10 - Sapindales
37 - 42	Myrtales	Myrtaceae	Myrtoideae	<i>Myrcianthes fragrans</i>	Simpson Stopper	Florida	Exh. 8 - Myrtales, Exh. 12 - South Florida Natives
42a	Asterales	Asteraceae	Asteroideae	<i>Montanoa bipinnatifida</i>	Tree Chrysanthimum	Central Mexico	
43	Malvales	Malvaceae	Bombacoideae	<i>Pachira aquatica</i>	Guiana Chestnut	Central and South America	Exh. 11 - Malvales
44	Fabales	Fabaceae	Mimosoideae	<i>Pithecellobium sp.</i>	Blackbeads	Mexico, Central America and northern South America	Exh. 6 - Fabaceae
44b	Malvales	Malvaceae	Malvoideae	<i>Phymosia umbellata</i>	Mexican Bush Mallow	Mexico	Exh. 11 - Malvales
45	Gentianales	Apocynaceae	Rauvolfioideae	<i>Plumeria rubra</i>	Frangipani	Mexico, Central America	N/A
46	Malvales	Malvaceae	Malvoideae	<i>Quararibea funebris</i>	Cacahuaxochitl, Rosita de Cacao, Funeral Tree	Mexico to S America	Exh. 11 - Malvales
47 - 54	Arecales	Arecaceae	Coryphoideae	<i>Sabal palmetto</i>	Sabal Palm/Cabbage Palm	Native- South Carolina to South Florida, Bahamas	Exh. 1 - Arecaceae, Exh. 12 - South Florida Natives
55	Arecales	Arecaceae	Coryphoideae	<i>Sabal yapa</i>	Huano Palm	Belize, Guatemala, Western Cuba and the Yucatan Peninsula	Exh. 1 - Arecaceae
56	Sapindales	Meliaceae	Cedreloideae	<i>Swietenia macrophylla</i>	Big leaf mahogany, Punab, Honduras mahogany	Mexico, Central America, northern South America	Exh. 10 - Sapindales
57	Polypodiales	Dryopteridaceae	N/A	<i>Tectaria heracleifolia</i>	Broad Halbard fern	Florida, Tropical America	Exh. 12 - South Florida Natives
58	Asperagales	Orchidaceae	Vanilloideae	<i>Vanilla planifolia</i>	Vanilla Bean, Flat-leaved Vanilla	Mexico, Central America	N/A

Planted in Other Gifford Arboretum Exhibits

Identification Number	Order	Family	Subfamily	Genus and species	Common Name	Area of Origin	Location
1	Fabales	Fabaceae	Mimosoideae	<i>Acacia farnesiana</i>	Sweet Acacia	South Florida	Exh. 12 - South Florida Natives
2	Fabales	Fabaceae	Mimosoideae	<i>Acacia sphaerocephala</i> a/k/a <i>Vachellia sphaerocephala</i>	Bull Thorn Acacia	Endemic to Mexico	Exh. 6 - Fabaceae
3	Picramniales	Picramniaceae	Alvaradoideae	<i>Alvaradoa amorphoides</i>	Mexican Alvaradoa	Mexico, Southern Florida	Exh. 12 - South Florida Natives
1	Lamiales	Bignoniaceae	N/A	<i>Amphitecna latifolia (=Enallagma)</i>	Black Calabash, Jicarillo de la playa	Mexico, Central America, West Indies	Exh. 7 - Bignoniaceae
4	Sapindales	Rutaceae	Toddalioideae	<i>Amyris elemifera</i>	Torchwood	Florida, Caribbean, Central America	Exh. 12 - South Florida Natives
5	Magnoliales	Annonaceae	Annonoideae	<i>Annona glabra</i>	Pond Apple	FL, Central America, and northern South America	Exh. 12 - South Florida Natives
1	Magnoliales	Annonaceae	Annonoideae	<i>Annona squamosa</i>	Sugar Apple	Tropical Americas and the West Indies	Exh. 9 - Angiosperms
2	Ericales	Primulaceae	Myrsinoideae	<i>Ardisia escallonioides</i>	Marlberry	Florida, Mexico, Guatemala, Belize, and Caribbean	Exh. 5 - Ericales
6	Ericales	Myrsinaceae	Myrsinoideae	<i>Ardisia escallonioides</i>	Marlberry	South Florida	Exh. 12 - South Florida Natives
4	Ericales	Primulaceae	Myrsinoideae	<i>Ardisia revoluta</i>	Tucuico	Central America	Exh. 5 - Ericales
2	Malvales	Malvaceae	Malvoideae	<i>Bakeridesia integerrima</i>	Indian Mallow Bush, Canary Mallow Tree	Central America	Exh. 11 - Malvales

3	Malvales	Malvaceae	Brownlowioideae	<i>Berrya cubensis</i>	Cortalagua Morada	West Indies, Mexico & Central America	Exh. 11 - Malvales
10	Incertae sedis	Boraginaceae	Boraginoideae	<i>Bourreria ovata</i>	Bahamian strong bark	Southeastern USA, Caribbean, Southern Mexico	Exh. 12 - South Florida Natives
4	Malpighiales	Malpighiaceae	Byrsominoideae	<i>Byrsosima crassifolia</i>	Nance, Golden Spoon, Savanna Serrette	Central and South America	Exh. 2 - Malpighiales
11	Ericales	Sapotaceae	Chysophylloideae	<i>Bumelia celastrina (a/k/a Sideroxylon celastrinum)</i>	Saffron Plum	Florida, Texas, Central and South America	Exh. 12 - South Florida Natives
6	Malpighiales	Malpighiaceae	Malpighioideae	<i>Bunchosia argentea</i>	Peanut Butter Fruit	Central and South America	Exh. 2 - Malpighiales
5	Sapindales	Burseraceae	N/A	<i>Bursera simaruba</i>	Gumbo limbo	Southern Florida, Mexican, Caribbean, Brazil & Venezuela	Exh. 10 - Sapindales
12,13	Sapindales	Burseraceae	N/A	<i>Bursera simaruba</i>	Gumbo-Limbo	Southeastern U.S., Mexico, Central America	Exh. 12 - South Florida Natives
16,17	Myrtales	Myrtaceae	Myrtoideae	<i>Calyptanthus pallens</i>	Spicewood	South Florida, Mexico to Costa Rica, Jamaica	Exh. 12 - South Florida Natives
18	Myrtales	Myrtaceae	Myrtoideae	<i>Calyptanthus ziygium</i>	Myrtle-of-the-River	South Florida, Tropical America, Caribbean	Exh. 12 - South Florida Natives
101	Gentianales	Apocynaceae	Rauvolfioideae	<i>Cameraria latifolia</i>	White Poisonwood, Palo de Leche	Southern Mexico, Guatemala, Belize, and Caribbean	Exh. 2 - Malpighiale
19	Brassicales	Capparaceae	Cleomoideae	<i>Capparis flexuosa</i>	Limber Caper	West Indies, Mexico, Central & South America	Exh. 12 - South Florida Natives
6	Sapindales	Rutaceae	Citroideae	<i>Casimiroa edulis</i>	White Sapote	Central Mexico to Costa Rica	Exh. 10 - Sapindales
102	Fabales	Fabaceae	Caesalpinioideae	<i>Cassia alata (=Senna alata)</i>	Candlebush	Mexico	Exh. 2 - Malpighiale
6	Malvales	Malvaceae	Bombacoidae	<i>Cavanillesia platanifolia</i>	Canoe Tree, Cuipo	Central America and northern South America.	Exh. 11 - Malvales
3, 4	Rosales	Urticaceae	N/A	<i>Cecropia palmata</i>	Cecropia	Tropics of Central and South America	Exh. 4 - Moraceae
102	Malpighiales	Chrysobalanaceae	N/A	<i>Chrysobalanus icaco</i>	Coco plum	Tropical Americas, Florida	Exh. 10 - Sapindales
104	Caryophyllales	Polygonaceae	Eriogonoideae	<i>Coccoloba diversifolia</i>	Pigeonplum, Doveplum	Coastal areas of Caribbean, Central America, Southern Mexico, South Florida	Exh. 10 - Sapindales
107	Caryophyllales	Polygonaceae	Eriogonoideae	<i>Coccoloba uvifera</i>	Sea Grape	S FL Coastal Woodlands & Keys, Caribbean, Tropical America	Exh. 10 - Sapindales
7	Malvales	Cochlospermaceae	N/A	<i>Cochlospermum vitifolium</i>	Poro-poro, Buttercup Tree,	Central America: dry forests	Exh. 11 - Malvales
25	Rosales	Rhamnaceae	N/A	<i>Colubrina elliptica (= C. reclinata)</i>	Soldierwood	Florida, Caribbean, Central America	Exh. 12 - South Florida Natives
18	Zingiberales	Costaceae	N/A	<i>Costus sp.</i>	Spiral Ginger	Pantropical	Exh. 13 -What is a tree
10	Ericales	Lecythidaceae	Lecythidoideae	<i>Couropita guianensis</i>	Cannonball tree	Central and South America	Exh. 5 - Ericales
103	Lamiales	Bignoniaceae	Crescentieae	<i>Crescentia cujete</i>	Calabash, Higuera	Mexico to Colombia, West Indies	Exh. 5 - Ericales
102	Cycadales	Zamiaceae	Encephalartoideae	<i>Dioon edule</i>	Palma de la Virgen, Chestnut Dioon	Endemic to coastal Eastern Mexico	Exh. 4 - Moraceae
104	Cycadales	Zamiaceae	Encephalartoideae	<i>Dioon spinulosum</i>	Giant Dioon	Endemic to tropical rainforests of Veracruz and Oaxaca, Mexico.	Exh. 4 - Moraceae
102	Ericales	Ebenaceae	Ebenoideae	<i>Diospyros digyna</i>	Black Sapote	Eastern Mexico and Central America	Exh. 6 - Fabaceae
28	Malpighiales	Euphorbiaceae	N/A	<i>Drypetes lateriflora</i>	Guania plum	South Florida, Bahamas, Greater Antilles, Mexico & Central America	Exh. 12 - South Florida Natives
101	Fabales	Fabaceae	Mimosoideae	<i>Enterolobium cyclocarpum</i>	Guanacaste, Ear-pod tree, parota, huanacastle	Central America, Mexico to Colombia	Exh. 1 - Arecaceae
10	Malpighiales	Passifloraceae	Turneroideae	<i>Erblichia odorata</i>	Flor de Fuego, Butterfly Tree	Southern Mexico to Panama	Exh. 2 - Malpighiales
25	Fabales	Fabaceae	Faboideae	<i>Erythrina herbacea</i>	Coral Bean, Cherokee Bean	South Florida, southern US, Mexico	Exh. 6 - Fabaceae
11a	Malpighiales	Euphorbiaceae	Euphorbioideae	<i>Euphorbia continifolia</i>	Smoketree Spurge	Mexico, South America	Exh. 2 - Malpighiales
13	Malpighiales	Euphorbiaceae	Euphorbioideae	<i>Euphorbia leucocephala</i>	Little Christmas Flower	Southern Mexico to El Salvador	Exh. 2 - Malpighiales
14	Malpighiales	Euphorbiaceae	Euphorbioideae	<i>Euphorbia pulcherrima</i>	Poinsettia	Mexico and Central America	Exh. 2 - Malpighiales
16	Malpighiales	Euphorbiaceae	Euphorbioideae	<i>Euphorbia tithymaloides</i>	Fiddle Flower, Myrtle-leaved Spurge	Tropical North and Central America	Exh. 2 - Malpighiales
33a, 33b, 33c	Sapindales	Sapindaceae	Dodonaeoideae	<i>Exothea paniculata</i>	Inkwood	S. FL, West Indies, Mexico and Central America	Exh. 12 - South Florida Natives
13	Ericales	Lecythidaceae	Lecythidoideae	<i>Gustavia superba</i>	Membrilla, Sachamango, Heaven Lotus	Central and Northwest South America	Exh. 5 - Ericales
102	Gentianales	Rubiaceae	Cinchonoideae	<i>Hamelia patens</i>	Firebush	American tropics from Florida to Argentina	Exh. 11 - Malvales
41	Gentianales	Rubiaceae	Cinchonoideae	<i>Hamelia patens</i>	Firebush	American subtropics and tropics	Exh. 12 - South Florida Natives
102, 103	Gentianales	Rubiaceae	Cinchonoideae	<i>Hamelia patens</i>	Firebush	Native-South FL Hammocks, WI, Mex, CA, SA	Exh. 9 - Angiosperms
110, 111	Gentianales	Rubiaceae	Cinchonoideae	<i>Hamelia patens</i>	Firebush	American subtropics and tropics, FL	Exh. 10 - Sapindales
32	Zingiberales	Heliconiaceae	N/A	<i>Heliconia pendula cv. Bright Red</i>	N/A	N. South America and S. Central America	Exh. 13 -What is a tree
102	Solanales	Convolvulaceae	N/A	<i>Ipomoea carnea</i>	Shrub Morning Glory	Mexico, Central America, South America	Exh. 1 - Arecaceae
34	Malpighiales	Euphorbiaceae	Crotonoideae	<i>Jatropha curcus</i>	Barbados Nut, Purging Nut, Physic Nut	Mexico and Central America	Exh. 13 -What is a tree
44	Laurales	Lauraceae	Lauroideae	<i>Licaria triadra</i>	Gulf Licaria, Pepperwood	Florida, West Indies, Central America	Exh. 12 - South Florida Natives
20	Malvales	Malvaceae	Grewioideae	<i>Luehea seemannii</i>	Guácimo Colorado	Guatemala to Colombia	Exh. 11 - Malvales
30, 31	Fabales	Fabaceae	Mimosoideae	<i>Lysiloma sabicu</i>	Sabico, Horseflesh Mahogany	West Indies, Cuba, Yucatan	Exh. 6 - Fabaceae
21	Malpighiales	Malpighiaceae	Malpighioideae	<i>Malpighia emarginata</i>	Barbados Cherry, Acerola	Yucatan, Mexico	Exh. 2 - Malpighiale
21	Malvales	Malvaceae	Malvoideae	<i>Malva viscus penduliflous</i>	Turk's Cap	Tropical America	Exh. 11 - Malvales
22	Malvales	Muntingiaceae	N/A	<i>Muntingia calabura</i>	Jamaican Cherry, Strawberry Jam Tree	Central America	Exh. 11 - Malvales
46	Myrtales	Myrtaceae	Myrtoideae	<i>Myrcianthes fragrans</i>	Simpson's Stopper	Southern Mexico to Peru, West Indies, South Florida	Exh. 12 - South Florida Natives
48, 49, 50	Laurales	Lauraceae	Lauroideae	<i>Nectandra coriacea (=Ocotea)</i>	Lancewood	South Florida, Mexico to Honduras, WI	Exh. 12 - South Florida Natives
23	Malvales	Malvaceae	Bombacoidae	<i>Ochroma pyramidale</i>	Balsa Tree	Central America, northern South America	Exh. 11 - Malvales
39	Caryophyllales	Cactaceae	Opuntioideae	<i>Opuntia ficus-indica</i>	Tuna, Barbary Fig, Prickly Pear	Mexico	Exh. 13 -What is a tree
24	Malvales	Malvaceae	Bombacoidae	<i>Pachira insignis</i>	Money Tree	Central and South America	Exh. 11 - Malvales
113	Lamiales	Verbenaceae	Verbenoideae	<i>Petrea volubilis</i>	Sandpaper vine	Mexico and Central America	Exh. 10 - Sapindales
11	Myrtales	Myrtaceae	Myrtoideae	<i>Pimenta dioica</i>	Allspice, Iknabakuk	Eastern Mexico, Central America, Jamaica	Exh. 8 - Myrtales
51	Fabales	Fabaceae	Faboideae	<i>Piscidia piscipula</i>	Jamaica Dogwood	South Florida, WI, Belize, Guatemala	Exh. 12 - South Florida Natives
52	Caryophyllales	Nyctaginaceae	N/A	<i>Pisonia aculeata</i>	Pull-and-Hold-back	South Florida, Texas, Central America	Exh. 12 - South Florida Natives

36	Fabales	Fabaceae	Mimosoideae	<i>Pithecellobium flexicaule</i> a/k/a <i>Ebenopsis ebano</i>	Texas Ebony, Ebony blackbead, Ebano	Texas- Mexico: Yucatan	Exh. 6 - Fabaceae
54	Fabales	Fabaceae	Mimosoideae	<i>Pithecellobium keyense</i>	Florida Keys Blackbead	South FL , FL Keys, Cuba, Mexico	Exh. 12 - South Florida Natives
44	Gentianales	Rubiaceae	Ixoroideae	<i>Posoqueria latifolia</i>	Needle Flower Tree, Jazmin De Embarcadero	Mexco to N. South America	Exh. 13 - What is a tree
107	Ericales	Sapotaceae	Chrysophylloideae	<i>Pouteria campechiana</i>	Eggfruit, Canistel	Mexico to Panama	Exh. 7 - Bignoniaceae
55	Rosales	Rosaceae	Amygdaloideae	<i>Prunus myrtifolia</i>	West Indian Cherry	South Florida, Mexico, West Indies to Brazil	Exh. 12 - South Florida Natives
108	Malvales	Malvaceae	Bombacoideae	<i>Pseudobombax ellipticum</i>	Shaving Brush (pink)	Southern Mexico and Central America	Exh. 1 - Arecaceae
28	Malvales	Malvaceae	Bombacoideae	<i>Pseudobombax ellipticum</i>	White Shaving Brush	Central America, West Indies	Exh. 11 - Malvales
29, 30, 31	Arecales	Arecaceae	Ceroxyloideae	<i>Pseudophoenix sargentii</i>	Buccaneer Palm	Florida, Yucatan, Cuba and Hispanola	Exh. 1 - Arecaceae
56	Gentianales	Rubiaceae	Rubioideae	<i>Psychotria nervosa</i>	Wild Coffee	Florida, Central America, South America	Exh. 12 - South Florida Natives
109	Caryophyllales	Cactaceae	Cactoideae	<i>Rhipsalis baccifera</i>	Mistletoe Cactus	Central America, South America, the Caribbean and Florida	Exh. 1 - Arecaceae
34, 35	Arecales	Arecaceae	Arecoideae	<i>Roystonea regia</i> (=R. <i>elata</i>)	Royal Palm	Native- Florida, United States, & Cuba; Mexico, Belize, Honduras.	Exh. 1 - Arecaceae
36	Arecales	Arecaceae	Coryphoideae	<i>Sabal mexicana</i>	Mexican Palmetto, Texas Palmetto	North America especially Mexico and Texas	Exh. 1 - Arecaceae
66	Celastrales	Celastraceae	N/A	<i>Schaefferia frutescens</i>	Florida-Boxwood	South Florida, Caribbean, Central and northern S. America	Exh. 12 - South Florida Natives
68	Ericales	Sapotaceae	Chysophylloideae	<i>Sideroxylon foetidissimum</i>	False Mastix	Florida, Caribbean, northern Central America, Mexico	Exh. 12 - South Florida Natives
68a	Ericales	Sapotaceae	Chysophylloideae	<i>Sideroxylon salicifolium</i>	Willow-Bustic	Southeastern United States, Mexico, the Caribbean, and Central America	Exh. 12 - South Florida Natives
69, 70	Sapindales	Simaroubaceae	N/A	<i>Simarouba glauca</i>	Paradise Tree	Southern Florida, tropical S. America and Lesser Antilles	Exh. 12 - South Florida Natives
112	Sapindales	Anacardiaceae	Spondioidae	<i>Spondias mombin</i>	Yellow Mombin, Spanish Plum	Tropical Americas	Exh. 5 - Ericales
113	Sapindales	Anacardiaceae	Spondioidae	<i>Spondias purpurea</i>	Purple Mombin, Hog Plum, Jocote	Tropical Americas	Exh. 5 - Ericales
33	Malvales	Malvaceae	Byttnerioideae	<i>Theobroma cacao</i>	Chocolate, Cacao	Mexico	Exh. 11 - Malvales
41, 42	Arecales	Arecaceae	Coryphoideae	<i>Thrinax radiata</i>	Florida Thatch Palm, Carribean Thatch Palm	South Florida, Keys, Bahamas Islands, Central America, West Indies	Exh. 1 - Arecaceae
112	Cycadales	Zamiaceae	Zamiodeae	<i>Zamia furfuracea</i>	Cardboard Palm	Eastern Mexico	Exh. 1 - Arecaceae

Non-representative Species Planned in the Maya Cocoa Garden Exhibit

Identification Number	Order	Family	Subfamily	Genus and Species	Common Name	Area of Origin/Distribution	G.A. Exhibit in which Non-Representative Species Belong, if any
100	Arecales	Arecaceae	Coryphoideae	<i>Bismarckia nobilis</i>	Bismarck Palm	Madagascar	Exh. 1 - Arecaceae
101	Polypodiales	Polypodiaceae	Polypodioidae	<i>Campyloneurum phyllitidis</i>	Long Strap Fern	Florida, Central and South America, West Indies	Exh. 12 - South Florida Natives
102	Dilleniales	Dilleniaceae	Dillenioidae	<i>Dillenia indica</i>	Elephant-apple, Chulta, Hondapara Tree	India, Sri Lanka, SE Asia, southern China	N/A
103	Magnoliales	Myristicaceae	N/A	<i>Myristica fragrans</i>	Nutmeg & Mace	Banda Islands of the Moluccas (E Indonesia)	Exh. 9 - Basal Angiosperms
104 - 106	Myrtales	Myrtaceae	Myrtoideae	<i>Psidium cattleianum</i>	Cattley Guava/Strawberry Guava	SE Brazil Atlantic Coast	Exh. 8 - Myrtales