Field Guide to the South Florida Ecosystem Preserve: Hardwood Hammock Nature Trail

Cover Illustration: *Clusia rosea* by Barbara Shlactman

*Clusia rosea* is a widespread Caribbean tree thought to be native to a few hammocks in the Florida Keys. It is drought, salt, and wind tolerant, and because of its hardiness, it is widely cultivated as a landscaping plant. The fruit is poisonous to humans.

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The nature trail was re-established, and the guide modified, through the work of Janine Bacquie in the summer of 2003.
Field Guide to the Hardwood Hammock Nature Trail:
South Florida Ecosystem Preserve

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Introduction
The preserve is a managed site, developed and planted with many mature West Indian hardwood trees and temperate zone plants in 1978. It reproduces, in part, specific communities indigenous to the Florida Everglades, and is home to 203 species of plants. The site serves as a demonstration and environmental education area for students, faculty, and staff. It is also provides habitat for 45 species of butterflies, 95 species of birds, approximately 20 species of reptiles and amphibians, and many mammals, including red fox, raccoons, and opossums.

This field guide is an attempt to present an overview of major plant species found in the hardwood hammock community. Plant illustrations are shown ¾ actual size. Basic information about physical characteristics such as climate and geology is also included. For more detailed information about South Florida environments and plants, refer to the bibliography at the end of the field guide.
**Climate**

South Florida's location, being nearer to the equator than any other area of the continental United States, with proximity to the Gulf Stream and the Gulf of Mexico, and having long days with intense solar radiation, qualifies it as a subtropical-marine climate. The occurrence of frosts, although only occasional, precludes its designation as a truly tropical zone. Prevailing winds are east and southeast in summer and northeast in winter except when cold fronts move in from the northwest. The climate, particularly from April to September, is humid. Rainfall averages 60 inches (52.4cm) yearly. It is a primary influence, along with the elevation of the land, in determining what plant species occur in an area. Temperatures average 67.8°F (19.7°C) in winter and 82.1°F (27.5°C) in summer. The warm ocean temperatures and low atmospheric pressure in the summer create favourable conditions for hurricanes to form. The Atlantic hurricane season is officially from 1 June to 30 November. Statistics since 1885 indicate that these storms occur every 6-8 years in this region. In 1992 Hurricane Andrew, the first major hurricane to hit Florida in almost thirty years, swept though Miami-Dade County, costing billions of dollars in property damage. The FIU preserve also sustained significant damage. Evidence of the storm can still be seen today, as there are many fallen and uprooted trees along the nature trail. These trees, toppled by the hurricane, provide habitat for many animals, insects, and fungi, and are an important part of a healthy hammock.

**Everglades Past**

The original Everglades flowed south from Lake Okeechobee as a broad shallow river sending water to the south and west into Florida Bay. It flowed along natural channels that cut across the Atlantic coastal ridge to the east ultimately emptying into the Atlantic Ocean. The FIU site is part of a former Everglades Wet Prairie.
Everglades Present: Existing Drainage Patterns in South Florida

Drastic modification of the hydrologic system has occurred as the result of drainage canals such as Tamiami Canal which draws water from the glades in large volume thus diminishing surface water flow. Additionally, dikes such as those of the conservation areas impound water and hold back what would be normal flow across the Everglades terrain.

Self-Guiding Trail

1. South Florida Slash Pine
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17. Live Oak and Epiphytes
18. Rattlesnake, Daboosn Holly
19. Willow Burtis
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1. **South Florida Slash Pine**
A stand of South Florida Slash Pines, also known as Dade county Pines, begins the nature trail. They are growing in what was once a wet prairie, but is now a drier upland environment caused by extensive draining of the Everglades. Pinelands serve as a sub-climax community and are maintained by nature through the periodic occurrence of fires. Fires serve to eliminate understory species and to activate pine seed germination and growth. Without fire in the pinelands, hardwood hammock species will invade and become dominant.

Pines are temperate zone plants that grow extensively along the limestone ridge in the southern part of the state. Due to timbering interests and development, the only large stands remaining are in Everglades National Park and Big Pine Key. Many wildflowers such as goldenrod and the white and yellow Spanish needle grow along the sunlit path and attract a variety of butterflies.
The fern-like coontie, a cycad, once grew prolifically throughout the major pine forests. The harvesting of coontie was a major industry in pioneer days, during the late 1800’s, when people gathered the rhizome (underground stem) as a source of starch. Larvae of the rare atala butterfly depend exclusively on the leaves of the coontie.

2. **Slough**
As you move though the open sunny area to the south, you are crossing an old slough that would have been a deeper depression in the former wet prairie. Here you can find low plants with slender linear leaves, such as sawgrass. Sawgrass is actually a sedge, not a grass, and is the plant most associated with the Everglades. Lacing across the slender leaves of these plants and stabilizing itself with curly tendrils as it trails is the passion vine with its miniature green flowers and small dark fruits which attract birds. Leaves feature bumps and knobs, which mimic the eggs of certain butterflies thus discouraging them from laying eggs on the plant. Small dots at the leaf base serve as nectaries, which provide food for ants.

3. **Succession**
Succession, the replacement of one plant community by another, is evident here. Broad-leaved plants begin to replace the grasses and sedges of the slough. One such plant is the Florida Trema. Its leaves are flattened on the branch. In season small orange fruits are arranged along the stem. These are attractive to birds and small mammals that consume the fruit and then disperse the seeds. The flowers are small and inconspicuous. They need not attract insects as the pollen is extremely fine and powdery and is easily carried by the wind. Trema is a pioneer plant and grows in open or disturbed places. It establishes itself in recently burned pinelands and in cleared areas along the edge of hammocks. The plant requires full sunlight and thus lives at the hammock’s border.
4. **Myrsine**
A plant adapted both to open places and shady hammocks is the myrsine. It is often a pioneer invader of recently burned areas. Myrsine is a hardy survivor of fires by means of stump sprouts. Along the branch, below the leaves, are located clusters of small flowers or black fruits. These are found on the female plant. You may notice small, dark bumps on the stems of the myrsine. These are the lobate lac scale insect, *Paratachardina lobata*, native to India and Sri Lanka. It was first documented in South Florida in 1999, and since then it has been found to infest at least 39 native plant species, many of which can be found in the FIU preserve. Species such as cocoplum, wax myrtle, red bay, strangler fig, wild coffee, and myrsine seem to be highly susceptible to infestation, which can be fatal to the plant. Currently, research into biological controls is being conducted in order to eradicate this pest.

5. **Red Bay**
As you leave the old slough site the land rises slightly. Here you are shaded by the red bay. It is a common tree of hammocks but especially likes wetter sites and grows along the margins of swamps. The leaves are glossy with a pale underside. Red bay is related to several economically important species; the avocado, camphor, and cinnamon. Like bay leaves used in cooking, the leaves of the red bay emit a spicy aroma when crushed.
**Myrsine** *Myrsine floridana*

**Red Bay** *Persea borbonia*

Myrsinaceae-Myrsine Family

Lauraceae- Laurel Family
6. **Geology**
Along the pathway, beyond the red bay, are rocks that are considerably elevated above the soil. We owe tribute to an ancient Pleistocene sea for this limestone. 100,000 years ago, when sea level was 25 feet higher than present, the shallow sea that covered the state of Florida was home to minute shelled bryozoan animals. Filter feeding organisms, the bryozoa set down the rock matrix of calcium carbonate. Ooids, small egg-shaped particles of calcium carbonate precipitated out of the seawater. These ooids fused with the bryozoan rock to form the base that, as time went on and the sea receded, became the floor of the freshwater everglades.

Altered by the action of rainwater, acting as a mild acid, the limestone dissolved and reprecipitated to become the hard yet permeable rock that is visible here.

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**Florida’s geologic history**

The Pamlico shoreline during the Pleistocene Period (approximately 100,000 years ago) indicates sea level 25 feet higher than the present. The Glacial Stage Low (about 20,000 years ago) indicates sea levels approximately 350 feet lower than today. At the end of the last glacial cycle, about 6,000 years ago, sea levels rose once again, and tropical plants began to flourish in South Florida. In this period the Everglades was born.
7. **High Hammock, Pigeon Plum**

As you move toward the south, the elevation rises to approximately 6.5 feet (2m) above sea level. This is the high hammock climax community. The term hammock indicates a raised area of land that supports a group of plants different from those in the surrounding environment. West Indian hardwoods predominate. A true high hammock species is the Pigeon Plum. The Pigeon Plum is recognizable by its bark, which is coarsely mottled with light and dark patches. A green sheath extends from the leaf stalk and surrounds the twig. This is the ochrea, another distinctive feature. Female plants bear clusters of dark fleshy fruits, which provide food for mammals and birds, which in turn disperse the seeds. A striking characteristic of young trees is that they have leaves larger than those of the mature plants. Their leaves are lanceolate in shape with a pointed tip.

8. **Depression**

An extension of the trail, beyond the pigeon plum, reveals a moist depression packed with dark muck soil mixed with silica (glass) sand. This sand came from the Appalachian Mountain region from which the igneous particles were washed down by longshore currents when the land was inundated by the sea. Depressions such as this one filled with soil are scattered throughout the preserve. Many of them result from limestone being dissolved by the acidic action of water on the calcium carbonate, forming solution holes which seasonally fill with rainwater. The water level in the depression indicates the water table.
9. **Mastic**

As you turn and leave the depression you pass the Sabal Palm, Florida’s state tree. To your left, behind the palm and several meters into the hammock, is the mastic, one of the tallest hammock trees. From the trail, you can see its exceptional height compared to the surrounding trees. Leaves have an undulate (wavy) edge and the bark can be seen to split off in large rectangular plates. Seed dispersal is assured by sweet, yellow-orange oblong fruits that serve as food for animals such as raccoons and squirrels. The date-sized fruits are easy to see on the tree and on the ground in February and March. Members of this family produce a milky sap, latex. From the sapodilla, a close relative, comes chicle, the main component of chewing gum. Caterpillars that specialize on diets of latex producing plants such as mastic have a clever way of stopping latex flow in the leaf tissue. They sever leaf veins and feed on the portion beyond the cut, avoiding eating the latex.

10. **Understory, Bitterbush**

The hammock grows in several layers or levels. Tall trees such as the mastic and pigeon plum whose crowns often overlap comprise the canopy. Beneath the canopy are small trees and shrubs that form the understory. Bitterbush is a small tree and typical understory plant. It has a compound leaf with 5–9 slender pointed leaflets. In the dry season, the leaves turn red. The female plant produces reddish berries. It is state listed as endangered and is limited to Miami-Dade county.
11. **Jamaica Dogwood**
The Jamaica Dogwood is easily recognizable by its odd-pinnate compound leaves with 5–9 greyish-green leaflets. It drops its leaves for one or two months in the winter. At the base of each leaf, you can see a swelling referred to as a pulvinus. It flowers in the spring, with delicate lavender flowers. Jamaica Dogwood is also called the Florida fishpoison tree. Historically, plant parts such as powdered bark and leaves were strewn into the water to stun fish.

12. **Wild Tamarind**
At the edge of the hammock and to your left is the wild tamarind. In this more open setting rather than in the deep hammock the tree develops a spreading umbrella-like crown. This characteristic makes it an excellent street and shade tree.
Beneath the lowest pair of leaflets you will find nectaries, glands that secrete nectar while the leaves are young. Ants visiting the nectaries may provide protection for the leaves against herbivores. The flat, slightly twisted pod places the tamarind in the bean family. As with other legumes, this tree contains nitrogen-fixing bacteria in its roots, which help enrich the soil.
**Jamaica Dogwood** *Piscidia piscipula*

**Wild Tamarind** *Lysiloma bahamense*

Leguminosae- Bean Family

Leguminosae- Bean Family
13. **Mahogany**

Continue to the west along the hammock edge. You will see young specimens of the West Indian Mahogany. Formerly a valuable timber tree, it is now rare in the United States. Its northernmost distribution is just south of Lake Okeechobee.

![Map of Mahagoni distribution](image)

The compound leaf consists of 6-9 paired leaflets. Each leaflet blade is wider on one side of the center vein than the other. When mature the mahogany has a large ovoid fruit that splits into sections. Winged seeds are dispersed by the wind.

Mahoganies are popular yard and street plants in South Florida. The tree is susceptible to attack by tent caterpillars. This, however, will not destroy the tree. If left to defoliate naturally, and with an application of nitrogen enriched fertilizer, the tree will recover as an excellent shade provider. This method is more ecologically sound than the use of pesticides to rid the tree of insects.

![West Indian Mahogany](image)

**West Indian Mahogany** *Swietenia mahagoni*

*Meliaceae* - Mahogany family
14. **Black Bead**
Proceed along the trail past mahoganies, myrsine, and bitterbush, and you will find the black bead. This is a common plant along edges of hammocks and pinelands in this area and particularly in the Florida Keys. Black bead is widespread in tropical America. Black bead is easy to recognize by its bipinnate leaf with 4 or 8 leaflets, and the extrafolial nectary on the petiole. The flowers are unusual in that 20-30 stamens form a rounded head. This structure is known as a mimosid flower. A distinctive characteristic of this legume is the coiled fruit that splits as it dries and curls revealing black seeds suspended by white or red arils (fleshy parts). Birds are most likely the main agents of dispersal.

15. **Gumbo Limbo**
As you re-enter the hammock a majestic tree with glossy bark, the gumbo limbo, continues the loop trail. On this highest elevation of the hammock the gumbo limbo thrives as a mature canopy tree. It shelters as part of its understory young pigeon plums, myrsine, small mahoganies, and its own seedlings.
The silvery or coppery bark is an outstanding feature of this tree. Notice its lustrous and scaling quality. This peeling bark gives it the nickname “tourist tree,” as it is reminiscent of a tourist’s peeling sunburn. The greenish brown fruits with thin red flesh cover extremely hard seeds. Bark and leaves are reported to be an antidote when rubbed on parts of the skin that have touched poisonwood, another hardwood hammock tree whose bark causes skin irritation.
16. Shortleaf Fig
Two native figs are found in South Florida: *Ficus citrifolia*, or shortleaf fig represented on this trail and *Ficus aurea*, the strangler fig. Both plants are biologically similar but are in different tribes. Each fig has a species-specific wasp necessary for its pollination. Flowers are borne on the inner surface of hollow sac like organs within the fig. Pollination depends on the minute wasp that carries out most of its life cycle within cavities in these flowers. Observe the leaf of the shortleaf fig. It is 5-10 cm long and has a rounded base. The leaf stalk is longer than half the width of the blade. A long (1-2cm) stalk supports the dark purple fruit. Several crops of fruit are produced each year. The fruit has many small seeds that are distributed by birds.

17. Live oak, Epiphytes
Live Oak is a temperate zone plant and though evergreen briefly loses its leaves in the coolest, driest time of the year. It never becomes wholly leafless. The leaves have a wide range of shapes; some are toothed while others are round. Saplings, usually found beneath the tree, show a high proportion of toothed leaves. The branches and corky bark support numerous epiphytes, plants that grow on other plants, such as orchids, bromeliads (air plants) and resurrection fern. This fern is brown and dead looking in dry weather, but becomes deep green in the rainy season. Epiphytes are not parasitic, therefore they gain no nutrients from the plant on which their roots are anchored. Oak leaves are a major food source for the bright green accordion-pleated larva of the polyphemus moth.
Shortleaf Fig *Ficus citrifolia*

Live Oak *Quercus virginiana*

Moraceae- Mulberry Family

Fagaceae- Beech family
18. Ecotone, Dahoon Holly
The land elevation becomes lower as you move toward the north. This slight drop represents an ecotone, a transition area between the high hammock and the moist slough. Dahoon is a beautiful evergreen and is a transition species. It favours moist soil. Leaves are oblong-ovate and stiff. The leaf tip is rounded and often has a tiny point at the notch. There are small teeth on the margin above the middle. Notice that the leaves have a short stalk and are arranged alternately along the branch. Red fruits on the female plant grow in clusters on a long common stalk. These are conspicuous in winter. Dahoon is related to the well-known American hollies that have stiff spiny leaves and are used in seasonal decorations. The local *Ilex vomitoria*, which grows into Northern Florida, has chemical properties that have been used by native Americans as an emetic.

19. Willow Bustin
Another ecotone plant, an inhabitant of the edges of hammock and pineland communities, is the willow bustin. It ranges from South Florida throughout the Florida Keys and is found in the West Indies, Mexico, and Central America. A close look at its leaves reveals their lanceolate shape. Leaves are smooth and blades taper at both ends. They are arranged alternately on the branch. Spring brings small, sweetly scented flowers. In summer, small black ovoid fruits cluster along the branch between the leaf bases. Willow bustin is a close relative of the mastic tree. Its wood is dense and reddish brown and serves locally as a cabinet wood.
20. Exotics, Australian Pine
As you pass the old slough, continue west across the access road. Tall Australian pines, exotic trees that superficially resemble the true pine, once grew here. However, in 1992 Hurricane Andrew destroyed the trees, leaving the large snags that you see today. These snags serve as lookout posts for many birds of prey, and are home to many animals and insects. Smaller Australian pines are starting to grow nearby. Australian pine was introduced in the 1800’s as a shade tree and windbreak. Now they grow freely throughout South Florida, have few natural enemies, and invade native ecosystems. The bark is ruddy and strip like, and what appear to be needles are actually segments of ribbed stem and circles of scale-like miniature leaves at each node.

Trail’s End
Though you have completed the hardwood hammock nature trail, a first trip should serve merely as an introduction. Return and walk the trail again as a review. Visit during other seasons, and see changes that will help you have a more complete understanding of this bit of wilderness resembling an Everglades hammock that thrives in an urban setting.

Willow Busic Dipholis salicifolia

Sapotaceae- Sapodilla family
**Australian Pine** *Casuarina equisetifolia*

References


Georgia Perimeter College, Clarkston, GA.


Howard, FW; Pemberton, R; Hamon, A; Hodges, GS; Mannion, CS; McClean, D (2002). “Lobate lac scale.” http://creatures.ifas.ufl.edu/ornt/scales/lobate_lac.htm

University of Florida, Gainesville


Metropolitan Dade County Planning Department (1979). *Comprehensive Development Master Plan for Metropolitan Dade County*. Miami, FL


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