

Volume 36: Number 1 > 2020

The Quarterly Journal of the Florida Native Plant Society



Palmetto



Meadows for Home Landscapes • Urban Trees • Native Passionflowers

Wax Myrtle (*Morella cerifera*)

Article and photos by Ginny Stibolt

Wax myrtle (*Morella cerifera*) is an easy-to-grow evergreen shrub or small tree that typically grows to 10-15' tall and 8-10' wide, but sometimes to 20' tall or more. It's native to all of Florida, even the Florida Keys, and naturally occurs in a variety of habitats including edges of wetlands, river margins, sand dunes, pine barrens, hillsides, and upland forests. The specific epithet *cerifera* means wax-bearing.

This species is dioecious – male and female flowers are borne in catkins on separate plants. At least one male plant is needed in the neighborhood to facilitate pollination of the female flowers, but female plants are preferred in the landscape because they produce fruit eaten by birds, particularly birds that are migrating during the winter.

Like many members of the myrtle family Myricaceae, both the leaves and the fruit are aromatic. The glossy leaves are 3-5" long and are dotted with tiny yellow resin glands. Leaves, particularly the new growth, emit a distinctive bayberry fragrance when crushed. The fragrant flowers are not showy, but the flowers on male plants, dull yellow catkins about 1" long, are easily seen. Flowers bloom in late winter and pollinated female flowers develop to become blue-gray fruits (drupes) in late summer to fall, with persistence through winter. Each fruit has an aromatic, waxy coating.

This shrub is similar to southern bayberry (*M. caroliniensis*), which is native to the Florida Panhandle and some counties in north and central Florida. The scentless bayberry (*M. inodora*) is native to the Florida Panhandle. There is a dwarf wax myrtle variety that only grows to about six feet tall that is sometimes



Wax myrtles play a number of important roles in the local ecosystem from enriching the soil through nitrogen fixation to being a larval food source for some hairstreak butterflies.

separated out as a different species (*M. pusilla*). The northern bayberry (*M. pensylvanica*) is native from the Carolinas north to Canada and is the traditional source of bayberry candle wax.

In the landscape

Wax myrtle is a fast-growing, versatile shrub or small tree that can be grown in full sun or partial shade. It's tolerant of drought, wind, salt, flood and fire, and is deer resistant. It also tolerates poor soils because it fixes nitrogen in a symbiotic relationship with an actinomycetes bacteria at twice the rate of a typical legume. It will grow in a wide range of soil conditions ranging from acidic to alkaline and from the edges of wet areas to dry xeric uplands. It tends to sucker and in some cases the suckers can form at some distance from the mother plant.

The evergreen habit of these shrubs means they are a good choice for screening on their own or mixed with other shrubs and they can be trimmed if necessary. Because of their quick growth and suckering habit, the screening becomes dense in only a few years. A wax myrtle screen offers good cover and food for wildlife. In addition to the fruit for winter birds, it is the larval food source for the banded hairstreak (*Satyrrium calanus*) and the red-banded hairstreak (*Calycopis cecrops*) butterflies.

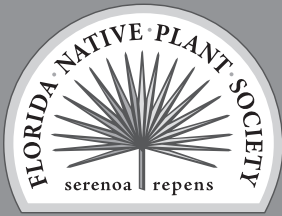
Wax myrtles are an excellent choice for large rain gardens, bioswales or the edges of seasonal retention ponds. Unlike other climates, Florida's rain garden plants need to be both flood and drought tolerant because of our seven-month dry season.

Wax myrtles can be used as an understory shrub at the edges of wooded areas and as part of groves built around



The fast-growing, evergreen wax myrtle can serve as a dense, low-maintenance screening in the landscape in full sun or partial shade and in damp or dry areas.

Continued on page 15



Palmetto

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Features

4 Meadows for Home Landscapes: More Than Just Wildflowers

The zeal to use native wildflowers to create pollinator gardens falls far short of meeting the maximum value that a pollinator garden is capable of providing. Learn how adding native grasses increases the diversity of plants and pollinators. *Article and photos by Craig Huegel.*

8 Rethinking Florida's Urban Trees

Florida's natural tree populations have been vastly reduced as more and more people have settled here. In suburban communities new trees have been planted at much lower densities than the original populations. In urban areas, tree density is even lower, but urban trees provide a number of important benefits. *Article and photos by Ginny Stibolt.*

12 The Native Passionflowers of Florida

There are six native members of the genus *Passiflora* in Florida. Two of the most common species are popular among gardeners because of their availability, but especially because they serve as larval host plants for a variety of butterflies. *Article and photos by Roger L. Hammer.*

Palmetto

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Editorial Content

We welcome articles on native plant species and related conservation topics, as well as high-quality botanical illustrations and photographs. Contact the editor for guidelines, deadlines and other information.

ON THE COVER: *Passiflora pallens*. This endangered passionflower is found in Broward, Miami-Dade, Collier, and mainland Monroe Counties in Florida. It grows along forest margins and in canopy gaps. Photo by Roger L. Hammer.

Meadows for home landscapes: more than just wildflowers



In nature, grasses provide diversity and physically support wildflowers, making them more accessible to pollinators.

Meadows are dominated by grasses. There is no place in nature where they aren't, and a flower garden planted solely with wildflowers is a poor substitute for the ecological value of a meadow. The well-

deserved attention currently focused on the loss of pollinators has given life to a movement to create pollinator meadows. The world of social media is rife with groups devoted to pollinators and native plant landscaping. This is exciting. After spending more than 3 decades extolling the value of creating living landscapes, it would seem that the movement is finally gaining a life of its own. The zeal to use native wildflowers to create pollinator gardens, however, falls far short of meeting the maximum value a pollinator garden is capable of providing. The reason lies in our definition of what a wildflower meadow is or should be.

Too few of us take the opportunity to explore a real meadow. The prairie ecosystem of Kissimmee Prairie Preserve, for example, is a classic example of how nature shapes a meadow. The tallgrass prairies of my Wisconsin childhood are another example. Visit them weekly and the display of wildflowers changes dramatically. It is a well-orchestrated symphony where each movement is dominated by different wildflowers. A few persist in bloom for months, but many others have their defined entrance and exit. Each attracts its set of pollinators and as it

goes to seed another takes its place. There is a diversity of blooms and each is integral to the whole. A meadow is a complicated work of art. It is not an impoverished collection of just a few species of trusty plants such as Spanish needles (*Bidens alba*) or a monoculture of bloom types. There are many members of the aster family in every meadow, but also deep and shallow tubular blooms. There are colors and shapes that fit the whole suite of possible pollinators. After all, nature has not given each pollinator the same size or an equal interest in flower species. The relatively simple concept of competition tells us that to get the greatest diversity of pollinators we would have to plant a great diversity of flowering species for them to pollinate. We also need to consider blooming times so there are always plants for them to pollinate. That too is the way that nature shapes a wildflower meadow.

What seems to be mostly missing from the discussions I read about creating wildflower meadows is a discussion of grasses. While our eyes take in the grand procession of wildflowers in a natural meadow, our plant blindness often fails to take in the most obvious thing in our line of sight – the meadow is mostly composed of native grasses and they are the most important component. If we are to create meadows for pollinators, we cannot ignore the role grasses play in these landscapes and we need to give far more consideration to including them. Grasses are the backbone we plant wildflowers into and they play many important roles in making meadows true pollinator gardens.

Perhaps most importantly, grasses provide structure. Without the support of native grasses, many wildflowers simply fall over. Blazing stars (*Liatris* spp.) are good examples. Tall species like dense blazing star (*L. spicata*), graceful blazing star (*L. gracilis*) and the one I most commonly grow in my landscape, savanna blazing star (*L. savannensis*), are notorious for tipping over as their stalks reach blooming size. This has aesthetic concerns, but more importantly, it forces pollinators to visit the flowers at a height most are uncomfortable doing. To be sure, it is much more hazardous for a butterfly to sip nectar at ground level than it is to do so several feet above it. It is rare to see these beautiful wildflowers with their flower stalks on the ground in a natural area. The stalks are supported by the grasses around them.

Grasses provide important habitat as well. The dense collection of leaves at their base provides important hiding cover for a great many wildlife species – invertebrates and otherwise. They reduce soil erosion and provide the only significant cover during the winter months when nearly every wildflower has gone to rest. I learned this the hard way when I planted my first wildflower meadow at the Pinellas County Extension office when I arrived in Florida 33 years ago. At the time, I knew far less about native plants than I let on. My wildflower collection was beautiful from spring through fall and then it collapsed. Winter arrived and all my wildflowers died back to the ground like nature told them to do. The entire area was essentially bare dirt. It was ugly to be sure, but it also was an ecological desert with no habitat value. Grasses provide habitat even when they've gone dormant. Most wildflowers don't. Grasses provide seed for seed-eating birds and small mammals and they provide cover for everything. A meadow of wildflowers cannot do that in any similar way.

By providing cover, grasses also serve to greatly reduce the ability of weeds to take control. This is more important in Florida than for any other state I've lived in and it is far more important in areas of former turf grass than it would be in a natural area. Beneath the cover of sod lies a rich seed bank of lawn weeds just waiting to be exposed to sunlight and soil disturbance. These seeds can persist for years and they will emerge as soon as you disturb the soil. Couple this with the fact that in most landscapes there is a constant "rain" of weed seeds entering your property from adjacent areas and you have a formula for eternal weeding. A foundation of native grasses significantly reduces the ability of weeds to find a crack to enter your planting areas.

Right after I moved into my new home in suburban Pasco County, I created an area in my turf for a wildflower meadow by removing the turf in small patches with a spade. With each new patch exposed an incredible number of weeds germinated, but I was able to remove them easily before I planted. I do not use mulch in areas like these because it hinders the ability of wildflowers to reseed just as it hinders weeds. Mulch also severely reduces the ability of ground-nesting bees to find the open soil they require for nesting. With each new area weeded assiduously for a month or so, I planted and removed the few weeds that continued to pop up out of the bare soil. Then I added native grasses. A year later, the grasses and seedling wildflowers have made it virtually impossible for weeds to find a foothold. My meadow is not completely weed free, but it would have been impossible for me to get to this point if I hadn't added grasses and began the way I did. What many pollinator gardeners also often fail to fully appreciate is that a great many butterflies use



Grasses for the home landscape. Left to right: wiregrass (*Aristida stricta*), splitbeard bluestem (*Andropogon ternarius*) and lopsided Indiangrass (*Sorghastrum secundum*).

grasses as host plants. While we turn our attention to the showy “megafauna” of the butterfly world, the monarchs and swallowtails, for example, a huge suite of butterflies fails to get the attention it deserves, as does the habitat these butterflies require to survive. As habitat continues to shrink daily in Florida, all of our fauna require consideration. This is not achieved through wildflower meadows designed to only produce nectar and pollen. Very few creatures are declining because of a lack of nectar and pollen. They are declining due to a lack of native host plants and the rampant use of pesticides. When we create the habitat each requires, we create the conditions each needs to reproduce. For many species in a pollinator garden, that is done by incorporating grasses into our meadows.

The guild of butterflies collectively known as the “grass skippers” use native grasses as host plants (as do many of the satyrs), but each has its own preferences and some grasses are not known to be used by any of them. When we design meadows, it is imperative that we add the grasses they require for food and shelter. It is ironic that we frequently disparage the presence of St. Augustine grass (*Stenotaphrum secundatum*) in landscapes, but it serves as the host plant for the Carolina satyr and at least three species of common grass skippers. The real problem of St. Augustine grass is that we mow it along with the potential caterpillars and make it useless ecologically. It also doesn't help that we frequently spread pesticides on it. On the other side of the coin, we often extol the virtues of native grasses based solely on their aesthetics, not fully considering the ecological role they will play once we've added them to our landscapes. Gulf muhly grass (*Muhlenbergia capillaris*), for example, is beautiful in the fall, but is not known to be a host for any of our several dozen grass-obligate butterflies.

It provides cover to be sure, but not much else. Even its tiny seeds are not especially important for seed-eating birds. That does not mean we should not incorporate these native grasses into our landscapes. Some that provide no value as butterfly host plants or a significant seed source for birds have value for the other things I've discussed above. A wildflower meadow should have a diversity of grasses just as it should have a diversity of wildflowers. I can never stress diversity enough.

Some grasses, like Gulf muhly, get rather robust and do not play well with others unless they are used in a large enough space or as an accent in areas where wildflowers are not the focal point. In smaller, more-typical sized landscapes, there are good native grasses that remain smaller and allow wildflowers enough space to prosper. Lovegrasses (*Eragrostis* spp.) can be very effective, but I find that they spread quickly if left to their own devices. That can be good or bad depending on your overall objectives and the space you have available. My favorites are the two species that I find to be better behaved. They also are adaptable to just about any typical landscape condition. There is no better foundation grass than wiregrass (*Aristida stricta*). Unless you burn your meadow (and consider it if you can), wiregrass will only spread slowly as each clump gains a bit of girth over the years. Its low stature allows taller wildflowers the sunlight they need and the structure it provides is invaluable. Pineywoods dropseed (*Sporobolus junceus*) has the same attributes, but it doesn't need fire to flower and set seed. Both of these are often available from commercial native plant growers, but far too infrequently. We need to create the demand they deserve.

Maximizing the value of wildflower meadows requires us to select grasses with the widest ecological benefits and that means adding the grasses that serve as butterfly host

plants along with all the other positive attributes grasses provide a meadow. These are some of the best among those offered in the trade. Regrettably, far too few native grasses are commonly sold commercially. Hopefully that will change as so many other things have changed in the years I've been promoting native plants in Florida.



Planting wildflowers along with native grasses in a home wildflower meadow increases plant diversity and the variety of pollinators who visit. It also discourages the growth of weeds.

NOTE: Meadow is used in this article to define a mix of native grasses and herbaceous flowering plants, not to indicate a type of ecosystem. To learn more about Florida's natural communities, see: www.fnai.org/PDF/AA_Short_Descriptions_Final_2010.pdf and *Ecosystems of Florida*, edited by R. L. Myers and J.J. Ewel, University Press of Florida.

Broomsedge (*Andropogon virginicus*)

Broomsedge is so common that we often fail to see how beautiful it can be in a landscape. While other closely related species in this genus are also used as hosts, broomsedge is known to serve as the host plant for the common wood nymph and five species of grass skippers – swarthy, neamathla, crossline, Delaware, and twin spot. While a few of these skippers have a limited range in Florida, others occur statewide. Broomsedge is a very forgiving native grass and will thrive in nearly any growing condition. Like all grasses, however, it does best with good levels of sunlight. Broomsedge is a bunch grass so it doesn't spread underground as a few other grasses do. It reaches a mature height of 3-4' in most growing conditions and produces fuzzy white seed heads that are attractive and used by winter songbirds. I have added it and splitbeard bluestem (*A. ternarius*) to my landscape.

Maidencane (*Panicum hemitomon*)

Maidencane requires wet soil to prosper, but if you live next to a pond or lake, it can provide important habitat and feeds the caterpillars of clouded, Delaware, and Aaron's skippers. Maidencane spreads by underground rhizomes so it will not stay put where you plant it as long as it has wet soils to exploit. Dry uplands will keep it in check. It can reach several feet in height in moist soil and several feet taller in shallow open water. Because of its open habit, it will mix well with other wetland plants and other bunch grasses. Redtop panicum (*Coleataenia rigidula*) also serves as a host plant for the Delaware and clouded skippers, but it is far less commonly grown. As a bunch grass, it is easier to control in a wet-site landscape.

Sugarcane plumegrass (*Saccharum giganteum*)

Another grass for wet sites is the beautiful sugarcane plume-grass. This robust native can reach 8' tall with its flower stalk in the fall so it is not a grass for small landscapes. In bloom, its stately flowers are burgundy red in color and as these seeds mature they change to silvery white. In my opinion there are few native grasses that can match its beauty; it just needs a lot of space and wet soils. The large seeds are a good food source for many winter songbirds, but it also is the host for clouded, Delaware, and byssus skippers.

Lopsided Indiangrass (*Sorghastrum secundum*)

There are few upland native grasses as beautiful as lopsided Indiangrass. Like the bluestems, it is very forgiving about its growing conditions as long as the site does not remain wet for long. As a bunch grass, it stays where it's planted. The basal clump of leaves gives way to a flower stalk in the fall that has seeds only on one side – hence the origin of its common and Latin names. The flowers quickly give way to shiny golden seeds favored by seed-eating songbirds. Indiangrasses serve as a host for many skippers – swarthy, Delaware, arogos, dusted, eufala, and twin-spot. Two other

species of *Sorghastrum* grasses are native to Florida and I suspect that they also serve as butterfly host plants. The salt and pepper skipper is known to use yellow Indiangrass (*S. nutans*) in other states. It should also do so here.

Fakahatchee Grass (*Tripsacum dactyloides*)

Though its common name suggests otherwise, Fakahatchee grass occurs statewide and actually ventures throughout the eastern half of the U.S. It is not a wetland grass, but performs well in nearly every typical landscape setting except the exceedingly well-drained soils of scrub and sandhill. Fakahatchee grass is one of just a few native grasses that I see widely planted in commercial sites. As such, it is commonly propagated. It is a clump grass that can extend 4' across and 4' in height. If you have the space, its seeds are a favored food source for many songbirds and it serves as the host for clouded, least, and broad-winged skippers. The related dwarf Fakahatchee grass (*T. floridanum*) is not reported as a host plant for any of our native butterflies.

Sawgrass (*Cladium jamaicense*)

Sawgrass is a technically not a grass, but a sedge. Its saw-toothed leaves can be a nuisance in places where one might walk about, but given a wet site where it can be left alone, it is an important graminoid for wildlife and a host plant for the Palatka skipper. It spreads by underground stems and eventually forms large colonies. Plant it at the edge of a pond and it will be a valuable addition to a site devoted to pollinators and wildlife.

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Craig N. Huegel is owner and operator of Hawthorn Hill Native Wildflowers. He teaches biology at St. Petersburg College, and is the author of *Native Florida Plants for Shady Landscapes*, *Native Wildflowers and Other Ground Covers for Florida Landscapes*, and *Native Plant Landscaping for Florida Wildlife*. His most recent book is *The Nature of Plants: An Introduction to How Plants Work*, published by the University Press of Florida.



Rethinking Florida's Urban Trees

Article and photos by Ginny Stibolt

Florida's natural tree populations have been vastly reduced as more and more people have settled here. In suburban communities new trees – often non-native species – have been planted at much lower densities than the original populations. In urban areas, the tree density is even lower, but urban trees provide a number of important benefits. While restoring more native tree habitat in suburban areas is relatively straightforward, in urban areas there are some complicating factors, so it's time to rethink Florida's urban trees.

Urban heat island effect

According to the Environmental Protection Agency (EPA), “the annual mean air temperature of a city with 1 million people or more can be 1.8–5.4°F warmer than its surroundings during the day. But in the evening, the difference can be as high as 22°F. Heat islands can affect communities by increasing summertime peak energy demand, air conditioning costs, air pollution, greenhouse gas emissions, heat-related illness, mortality, and water pollution.”

The usual advice to combat the urban heat island effect is to plant more trees. The benefits of trees in cities are amazing.

- An urban tree canopy helps to cool the air between four to twelve degrees Fahrenheit, depending upon conditions. This temperature reduction can reduce the need for air conditioning by up to 30%. The cooling by trees is due to a combination of shade and transpiration. Transpiration is the process where more than 90% of water that a plant absorbs runs right through it and evaporates through the stomata (pores) on the leaves. As each water molecule goes from liquid to gas, the air is cooled.
- A single healthy, full-grown tree absorbs more than 4,000 gallons of water per year. This helps to mitigate street flooding and reduce the strain on stormwater management systems, but this effect will be far greater if the trees are installed with infrastructure designed for this purpose, such as curb cuts and bioswales or more technical systems with grates and overflow drainage. Integrating stormwater management with tree installations is beyond the scope of this article, but do your research to come up with the most viable solution for your situation before beginning an urban tree program.
- A single, healthy, full-grown tree absorbs about 300 pounds of carbon dioxide, our most abundant greenhouse gas, each year. Other urban air pollutants are also absorbed and metabolized.
- The presence of healthy trees improves neighborhood real estate values.

Left: These old street trees seem healthy, but this city could expand room for their roots. Maybe this would be a good place to install a small pocket park between the trees and a bit into the road as well. Unmortared bricks are a reasonable surface for use around trees since they allow water to soak in and can be reconfigured over the years to accommodate the tree's growth.

Baltimore, Maryland values each tree in its canopy at \$57,000, which includes all the benefits of reduced temperatures, reduced pollution, carbon sequestration, water absorption, increased tax base, and decreased crime. When trees are viewed as an investment like this, the arguments for preserving and maintaining them are easier to make, because urban trees require more care than those growing in a forest.

The monetary value of trees in Florida is probably higher than those further north. In fact, Florida has more urban trees than any other state, especially in the northern half of the state. Tallahassee is among America's most treed cities with 55% total tree coverage, the highest percentage of any comparable city.

Successful urban tree programs are complex tapestries of public and private initiatives

Once it's decided that a new tree program will happen, it's best to include local residents early in the planning so they'll know what's going on and play a part in some of the decision making. This is especially important if they are expected to help with ongoing irrigation, maintenance, and clean up. In some cases, public/private partnerships to implement and manage ongoing support for greening projects in cities work well.



The very popular High Line Park in New York City serves as a wonderful example of a public/private partnership formed to provide a significant green space in a crowded city.



Plan ahead! These longleaf pines (*Pinus palustris*) were planted too close to overhead wires. The best case scenario as they mature is that only half of their branches will be pruned away. Worst case is that they'll be removed entirely and that people in charge of making decisions on street trees will decide that native trees don't do well in urban environments.

A good example of this is Friends of High Line Park in New York City (www.thehighline.org), which raised funds for the creation and ongoing maintenance of this immensely popular park. Built on a section of abandoned elevated train tracks, this park has enhanced and uplifted the nearby neighborhoods on the west side of Manhattan.

Ideas to consider when planning an urban tree program

Wherever possible, keep old trees. Mature trees soak up more water, absorb more carbon dioxide, produce more oxygen, and provide more shade than newly planted trees. It might take a newly planted tree 15 or 20 years to gain enough size to provide the level of benefits provided by a mature tree. Baltimore places a high value on each tree to make the case for financial support. This protects trees with a well-planned program of monitoring and maintenance. In many cases it also means rethinking sidewalks and curbs to accommodate the roots of mature trees.

For new plantings, select a variety of native trees that will work well in an urban setting. Instead of the default option of planting the same tree species up and down every street, select five to ten different species planted more randomly. This diversity avoids the problems that happened a generation ago when Dutch elm disease decimated elm-lined streets in the northern region of the country. Elms were glorious – perfect street trees with high arching branches – but communities lost their entire tree canopy. Planting a variety of trees means that if one species suffers a blight, the spread will be slower and other tree species will continue on. Also, different species may react differently to climate change, so having a variety of trees will make the urban tree canopy more resilient. A diversity of native trees and shrubs also provides better support for birds, butterflies, and other wildlife that need our help in the face of climate change.

Characteristics of sustainable street trees

Size – Smaller native trees will grow well in a variety of planting locations. But wherever there is room, even in small pocket parks, choose medium to large native trees, because they absorb more carbon dioxide, soak up more water, and cool the air more.

Shape – Reduce tree interference with the movement of people and cars. Choose trees with a more vertical shape whose branches grow at an upward angle, not straight out or drooping down.

Maintenance – Trees that don't send up a lot of suckers or knees from the base require less maintenance as do trees that are not too messy. When fruits and leaves are dropped in a short amount of

time, clean-up does not become a year-round project.

Water use – Florida has a seven-month dry season. Where there are curb cuts or rain gardens that soak up urban rainfall, choose trees that can withstand both flooding and drought.

Spending time and money on urban tree programs is a smart investment

Increasing urban tree populations provides many benefits. Some are immediate and measurable, while others are harder to define. But people feel better physically and mentally when they live in cities with good tree canopies. Seeing more birds and butterflies is a bonus.

References and Further Reading:

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Tree planting 'has mind-blowing potential' to tackle climate crisis: www.theguardian.com/environment/2019/jul/04/planting-billions-trees-best-tackle-climate-crisis-scientists-canopy-emissions

A look at Jacksonville's LaSalle bioswale project



The LaSalle bioswale project several years after planting.

This bioswale project had a lot of initial support. The City of Jacksonville and various agencies in the city, including the St. Johns Riverkeeper, worked together to come up with a plan and found a big sponsor. It was completed in 2012 and was to be the first of many bioswales. Over the years, no other such swales have been installed by the city and the maintenance of the LaSalle bioswale is still handled by volunteers, not city workers.

I talked to Jimmy Orth, Executive Director for the St. Johns Riverkeeper, about this bioswale project a few years ago. I thought it was time for some updated questions about where things stand now and the possibility of similar projects in the future. Here is the Q & A:

Ginny Stibolt (GS): Have any more bioswale projects been built in Jacksonville since then? If not, what would change this?

Jimmy Orth (JO): There may have been a few constructed

for private construction projects, but none by the City to manage stormwater. A big part of the problem is that the Florida Department of Environmental Protection has not adopted green infrastructure strategies as preferred stormwater Best Management Practices (BMPs) for local communities to meet their Municipal Separate Storm Sewer Systems (MS4) stormwater permit requirements. Many local governments, like Jax, are also reluctant to implement these strategies due to concerns about the effectiveness of green infrastructure BMPs (less research and data exist), a perception that they will cost more and be more difficult to maintain, and lack of consideration for the multiple benefits provided (aesthetics, water quality, resiliency, habitat, etc.).

GS: Are volunteers still doing all the maintenance on the bioswale, or have city workers taken over?

JO: Volunteers, but it really doesn't require much maintenance since the plants have filled in.

GS: Are there regrets about the limited plant palette – bald cypress (*Taxodium distichum*), dwarf yaupon holly (*Ilex vomitoria*) 'Nana' (a male clone), muhly grass (*Muhlenbergia capillaris*), and sand cord grass (*Spartina bakeri*)?

JO: No. At the time, we wanted to use plants that were fairly easy to find, could easily be incorporated into other landscaping projects, and would be acceptable to the public. As you know, people have to see that the use of native plants can be successfully incorporated into a more traditional or manicured landscape.

GS: Were bald cypresses really the best trees for this location? Won't they get too large?

JO: No, cypress have proven successful in many right-of-way projects and seem to withstand dry conditions and the occasions when there may be periods of standing water.

GS: Are there any other lessons learned from this site?

Continued on page 15

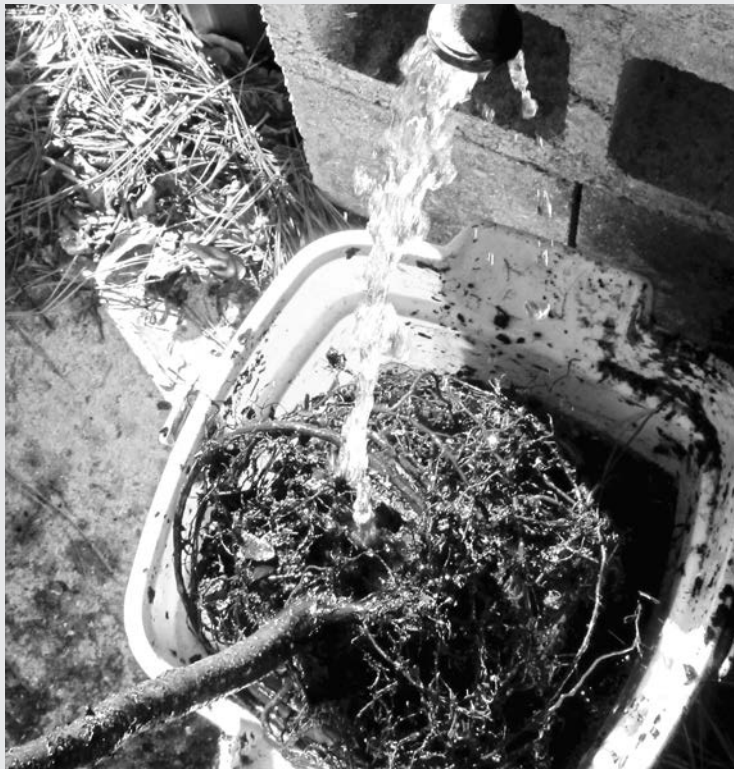
Dealing with container-grown trees

Here are two major considerations to increase success when using container-grown trees in urban environments. This advice does not apply to field-grown trees, which are often much larger and installed with heavy machinery.

1. Use younger, un-topped trees with a caliper of less than half an inch (caliper is the trunk diameter at six inches above the soil line). These small trees will adjust much faster to their new surroundings and will begin to grow more quickly than older ones that have been held in pots much longer. In an urban environment, young saplings will need protection for two years or more, so you will need to install two to four sturdy stakes placed firmly in soil surrounding the tree to protect it from foot traffic and more. It's best not to tether the tree tightly to the stakes, because the tree should be able to move and grow.

2. The best practice for planting container-grown trees is to rinse all the growing medium away and to not add any amendments into the planting hole. This may go against everything you've heard before, but there is real science behind this advice. The growing medium in the container is much richer than the soil in the tree's new location, so if you don't rinse it away, the roots will tend to circle around in the rich soil and not spread out. You want the roots to spread out so the tree will be more wind and drought tolerant.

Rinsing the roots also allows you to find and correct circling roots so the tree does not girdle itself as it grows. You can also find the real root flare, which is sometimes buried during



Rinse the roots so you can find the root flare, correct circling roots, and help the tree to adapt to its new soil. This seems harsh, but you want the roots to grow beyond the planting hole so the tree will become more wind and drought tolerant.



This poor tree didn't have a chance. The root flare was buried deep in the container and the roots never ventured from the planting hole. The potting media is still intact. Rinsing the potting soil away would have given this tree a better chance for survival.

repotting. It should be at least an inch or two above the final soil line, because trees that are planted too deeply don't do as well. The root flare is the outward curve at the bottom of the trunk where the first roots act as a buttress to stabilize the tree. Trees that are grown from cuttings may not have well-developed root flares.

Dig a shallow, wide hole with a higher, solid center, because you don't want the tree to sink. Spread out the roots in all directions. At this point, correct the circling roots. To keep them from coiling back toward the tree, stake them in place. Then mud in the tree's roots with only the soil you dug out. This harsh treatment of the tree will require more initial irrigation at planting time and on a daily basis for a week or more and then a couple of times per week until it stops wilting. If you plant dormant trees, this is reduced because there are no leaves to wilt, but the roots still need to be watered during this period.

What to do with all that rich planting media that you rinsed away? Use it (mixed with compost if you have it) as a topdressing on the soil in a wide circle around the tree, but well outside of the planting hole. Don't dig it into the soil, but you could add an organic mulch on top of it. This compost topdressing will enrich the soil outside of the planting hole and thus entice the tree's roots to spread outward instead of circling in the planting hole. Mulch new trees with organic mulch such as chipped wood from tree cutters or pine needles to help retain moisture and reduce weeds, but do not let the mulch touch the trunks.

Reference:

Root rinsing: www.informedgardener.com



A nighttime communal roost of zebra longwing butterflies in the author's yard.

The Native Passionflowers of Florida

Article and photos by Roger L. Hammer

Few flowers are as beautiful and captivating as those in the genus *Passiflora* – the passionflowers – and they have even found a place in Christian theology. In 1609, a monastic scholar named Jacomo Bosio was writing his treatise on the Cross of Calvary (the wooden cross where Jesus was crucified), when Emmanuel de Villegas, an Augustan friar born in Mexico, arrived in Rome with drawings of a passionflower. These enchanting flowers were unknown to Europeans at the time, and Bosio became so enchanted with this Neotropical flower that he decided to include it in his writings because he believed it represented the period of Christ's suffering on the cross during crucifixion, referred to as the Passion. Hence the name passionflower.

Bosio concluded that the tendrils symbolized the whips, the filaments depicted the crown of thorns, and the five sepals and five petals represented the ten faithful apostles (minus Judas and Peter who betrayed Jesus). The five anthers stood for the five wounds received by Jesus, with the three stigmas being the nails. Spanish descendants in the Caribbean still call passionflowers *flor de las cinco heridas*, or “flower of the five wounds.”



Left to right: Two widely cultivated passionflower species, *Passiflora incarnata* and *Passiflora suberosa*.



This page, clockwise from top left: *Passiflora multiflora*, *Passiflora sexflora*, *Passiflora lutea* and *Passiflora pallens*.

The larvae of many heliconid butterflies feed exclusively on passionflowers, so some *Passiflora* species have developed ways to thwart being eaten. Some species have evolved to produce toxins that will kill butterfly larvae, while others use varying leaf shapes to avoid being detected by female butterflies. Others produce extrafloral nectar glands that attract ants, and these in turn will attack butterfly eggs and larvae. Yet another ingenious ploy is deceit. Female butterflies will bypass plants that already have butterfly eggs on them, so some passionflower species produce tiny bumps, spots, or glands that look identical to butterfly eggs, causing female butterflies to look elsewhere to lay their eggs.

There are currently about 500 accepted species of *Passiflora* that are distributed mostly in the Neotropics, with additional named varieties and naturally-occurring hybrids. *Passiflora edulis* and *Passiflora flavicarpa* have even gained worldwide notoriety because they are widely grown for their nutritious fruits, which are used primarily to make delicious passionfruit juice. The fruits have many health benefits, including being high in antioxidants.

There are six native members of the genus *Passiflora* in Florida. Two of the most common species are popular among gardeners because they are available at nurseries that specialize in native plants and because they serve as larval host plants for the zebra longwing (Florida's official state butterfly), the Gulf fritillary, and the variegated fritillary, plus the Julia heliconian in the southernmost Florida counties. Larvae of the variegated fritillary will also feed on plants in other genera, namely species of *Linum* (flax), *Portulaca* (purslane), and *Viola* (violets).

The most widespread native species in Florida is *Passiflora incarnata*, which is vouchered from all but 12 counties on the Florida mainland, but it likely occurs in most of those, too. Common names include purple passionflower, maypop, and apricot vine. It produces fragrant, very showy, purplish flowers that average about 3" wide, and these are followed by round, 2" yellowish-green fruits. It requires a stout fence or arbor and has the propensity to spread aggressively from root suckers in all directions, so plant it where you can mow around the parent plant or you will likely come up with some colorful, and deserving, curse words. It is very cold-tolerant and ranges west into Texas and north to Missouri, Indiana, and Delaware. *Passiflora incarnata* has been hybridized with the tropical American *Passiflora cincinnata* to produce *Passiflora* x 'Incense' with large, intensely-fragrant blossoms.

Another species that is widely cultivated in Florida is *Passiflora suberosa*, although the recent treatment of the Passifloraceae in the *Flora of North America* states that what has been called *Passiflora suberosa* in Florida is actually *Passiflora pallida*. Taxonomists with the *Flora of Florida* disagree because they believe the characteristics used to separate them are minuscule and not consistent (A. Franck, personal communication, March 2020). It has also been suggested that Florida plants should be treated as *Passiflora suberosa* var. *pallida*. Regardless, this passionflower has extremely variable leaf sizes and shapes, and is a preferred host for heliconid butterflies. The bark on mature plants has corky outgrowths, giving rise

to the name corky-stem passionflower (*suberosa* is Latin for "corky"). Unlike most other species, the corky-stem passionflower is rather petite and can be grown on a small trellis or allowed to scramble around on shrubs. The flowers have white sepals (petals are absent), and are about the size of a dime, making them among the smallest in the genus. The filaments are pale yellowish green. Songbirds eat the small, oval, 3/8" fruits that ripen dark purple to black. Outside of Florida it ranges from southern Texas south into South America and through the West Indies, including the Bahamas.

Perhaps the rarest species in Florida is the state-listed endangered *Passiflora multiflora*, which is restricted in Florida to the Upper Florida Keys. The half-inch, clustered flowers have greenish white sepals and white petals, with yellow filaments that are white at the base. This species has unlobed, softly-hairy leaves and it typically grows along the edges of tropical hardwood forests where it climbs on trees and shrubs. It is sometimes cultivated by butterfly enthusiasts in the Florida Keys and on the southern mainland but it appears that it is seldom used as larval food by butterflies. Its range extends into the Bahamas and Greater Antilles.

Another endangered species in Florida is *Passiflora pallens*, with showy white flowers measuring about 2" wide. The filaments are white with purple rings along their length. The leaves are shallowly three-lobed and the oval, 2" fruits are yellow. It is only known in Florida from Broward, Miami-Dade, Collier, and mainland Monroe Counties, where it grows along forest margins and in canopy gaps, despite its misleading name, "pineland passionflower." This species is not a preferred host plant for heliconid butterflies and I have never seen leaf damage from larvae on wild plants, nor on cultivated plants, but it is worth growing just for the pretty flowers. Its range includes Cuba and Hispaniola.

Passiflora sexflora, or goatsfoot, is a state-listed endangered species known in Florida only from mainland Miami-Dade County where it is reported from only five hammocks east of Everglades National Park, and a few hammocks on Long Pine Key within Everglades National Park. The species name refers to six flowers, which was thought to be an identifying characteristic of this species by French botanist Antoine Laurent de Jussieu (1748–1836), who named it in 1805. The common name relates to the shape of the leaves, which are softly hairy with three lobes, but the center lobe is much shorter than the lateral lobes, resembling the hoof of a goat. The flowers have greenish white sepals, white petals, and white filaments with purple bases. The blue-black fruits are oval or ellipsoid and measure about 3/8" wide. It ranges south through the West Indies into tropical America.

Finally, there is *Passiflora lutea*, or yellow passionflower, a cold-hardy herbaceous species with a distribution in Florida from Hernando and Lake Counties north and west through the Florida Panhandle and from Georgia west to Texas and north to Kansas, Missouri, Pennsylvania, and Delaware. It dies to the ground in winter and resprouts from its roots in springtime. It is suitable to grow on a trellis, fence, or

allowed to climb trees like it does in nature, even though John Vanderplank, in his book *Passion Flowers* (2000) writes, “It has little value as an ornamental pot plant or garden plant.” We lovers of Florida native plants would respectfully disagree. The sepals are green with very narrow greenish yellow petals, and the yellow filaments are green or white basally.

So, whether you grow Florida’s native passionflowers for their compelling blossoms, or to attract songbirds and butterflies, they are certain to add charm and beauty to your home garden.

LaSalle bioswale project

Continued from page 10

JO: I think the project has proven that green infrastructure can be successfully implemented as a stormwater management tool in Jax. With sea level rise and climate change now on the radar, the time has come to embrace green infrastructure and the benefits of natural solutions.

Takeaways from this project

- The state has not yet incorporated green infrastructure into their BMPs (Best Management Practices) and cities are reluctant to act on their own to do so.
- Organizing urban green infrastructure projects takes a lot of planning because there are so many groups that need to weigh in. And it’s very important to have local residents heavily involved.
- Plants and their landscapes do not take care of themselves in urban settings. Funding for coordination of ongoing care needs to be included in the initial cost.
- If bioswales will be the new normal, then city workers need training on how to care for them. Volunteers cannot be expected to do all the maintenance.

My personal take on the bioswale plant selection

Bald cypresses will be fine for a while, but they are large trees and may develop knees that could disrupt sidewalks and roads. They are excellent for large bioswales with lots of space because they tolerate standing water and drought. For this location, I would have chosen sweetbay magnolia (*Magnolia virginiana*), East Palatka holly (*Ilex x attenuata*), red maple (*Acer rubrum*), blackgum (*Nyssa sylvatica*) and cabbage palm (*Sabal palmetto*).

Male dwarf yaupon hollies will not feed birds. They get large if not trimmed back and also produce suckers. This project uses too many hollies and they are planted too close together. A variety of shrubs like beautyberry (*Callicarpa americana*), inkberry (*Ilex glabra*), native blueberries (*Vaccinium* spp.), and viburnums (*Viburnum* spp.) would be visually interesting and more useful to pollinators and wildlife.

The grasses are fine, but more than one species should be used, along with perennial wildflowers such as goldenrods (*Solidago* spp.) or swamp sunflower (*Helianthus angustifolius*).

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Roger L. Hammer is an award-winning professional naturalist, author, botanist and photographer. His most recent book is *Complete Guide to Florida Wildflowers*. Find him online at www.rogerhammer.com

Further Reading:

For background and project progress, visit: <http://jaxlid.blogspot.com/>

For a wide-ranging and detailed report on storm resiliency for Jacksonville, see: www.coj.net/sraidrcommittee. Click on two handouts for 05-10-19: “Jacksonville’s-storm-resiliency-and-infrastructure” (includes the LaSalle bioswale), and “Trees to Offset Stormwater Case Study.”

Natives For Home Landscapes: Wax Myrtle

Continued from page 2

stand-alone trees in the landscape. Their ability to fix nitrogen improves the soil for the whole area.

In natural areas, wax myrtles grow back quickly after fires and occur naturally in fire-prone habitats. But, in the home landscape, these shrubs are potential fire hazards because the leaves, stems and branches contain flammable aromatic compounds, so do not plant them in areas near fire pits or barbecue sites. In fire-wise landscapes, keep these shrubs at least 30 feet away from buildings.

Wax myrtles are readily available from Florida Association of Native Nurseries (FANN) members. You can find native nurseries that have this plant in stock or find a native nursery near you at www.plantrealflorida.org.

After planting this shrub, provide constant moisture for several weeks or longer in the dry season. Once established, it requires no additional irrigation and no other general maintenance except to trim it back if necessary. Wax myrtles are a great addition to your Florida native yard. Let’s make native plants the new normal in Florida.

For more information:

Visit the USDA & US Forest Service Fire Effects Information System page on *Morella cerifera*: www.fs.fed.us/database/feis/plants/shrub/morcer/all.html

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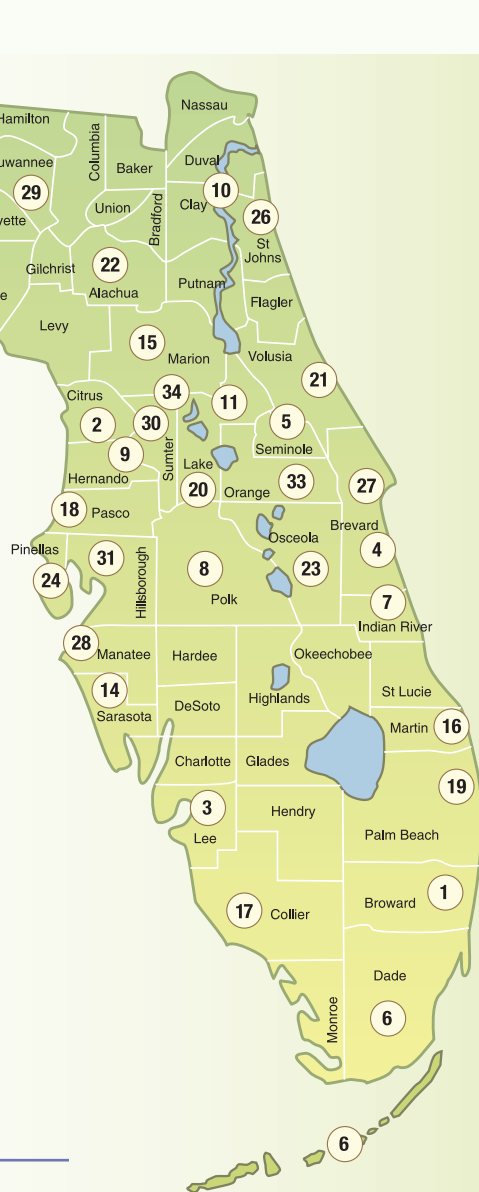
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