Museum of Arts and Sciences

Sweet Gum Trail Digital Field Notebook

Created by Maegan Ennis

Sweet Gum Trail

First opened more than 30 years ago, the Sweet Gum Trail is open to the public and features a paved trail, man-made pond, native plant garden, the historic Kingfisher Cabin, and environmental sculpture by Beverly Buchanan.

Awards

The Museum of Arts and Sciences was awarded the 2013 Native Landscape of the Year Award at the South Georgia Native Plant & Wildflower Symposium held on the University of Georgia Tifton Campus. Co-sponsored by UGA and the Garden Clubs of Georgia, the award recognizes the innovative and educational use of native plants in the landscape of the Museum's Sweet Gum Trail.

Master Gardeners

Thanks to the Master Gardeners of Central Georgia, visitors to the Museum may stroll along the Sweet Gum Trail and discover new ways to use beautiful, low-maintenance native plants in their home landscapes. Landscaping with native plants, wildflowers, and grasses improves the environment and attracts a variety of birds, butterflies, and other animals. Once established, native plants do not need fertilizers, herbicides, pesticides or watering.

Native Garden

In 2010, the Master Gardeners of Central Georgia established a native plant garden at the Museum to enhance the landscaping around Kingfisher Cabin. In addition to maintaining the garden, the volunteers have been working to eradicate invasive species and restore other existing native plants along the trail. This beautiful garden is thriving and includes a wide variety of native plants like Oakleaf Hydrangea, Red Buckeye, Spotted Trillium, and Ocmulgee Skullcap. Several species of native plants growing in the garden are considered threatened or endangered. Because plants are identified, the garden serves as a valuable educational resource for the Museum's Curators who use the Sweet Gum Trail as an outdoor classroom.

The Museum has installed Dark Sky Compliant exterior lighting, added artwork and sculptures such as the "Temple of Wonder" (right) and various interactive sculptures created by Alexis Gregg and Tanner Coleman.

Trail Map

Various plants along the trail are marked with QR codes that you can scan to learn more about them. Use this map to help find the QR codes!

QR Codes

★- Trail Head
1 - Loblolly Pine Tree
2 - Ferns
3 - Magnolia Trees
4 - Moss
5 - Sweet Gum Tree
6 - Bald Cypress Tree
7 - Invasive Species
8 - Stumps
9 - Fringed Campion
10 - Pecan Tree

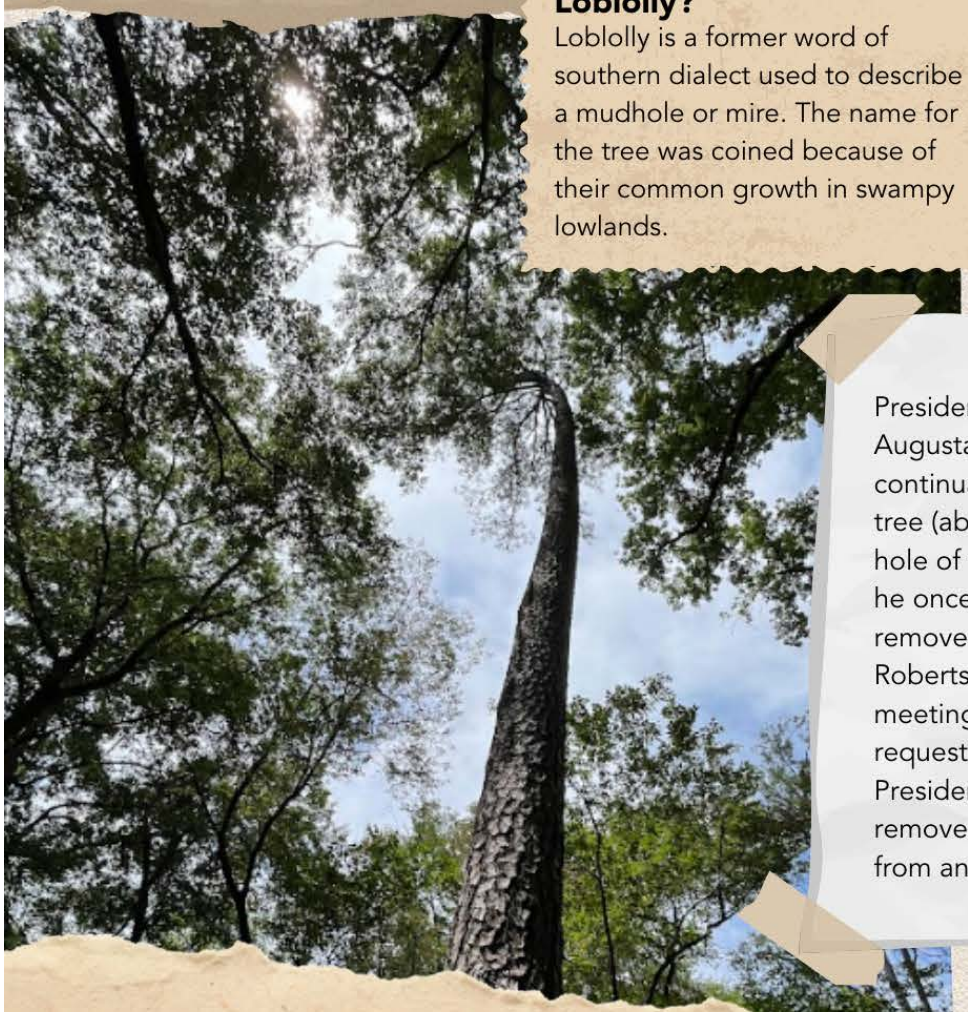
Loblolly Pine

Pinus tidea

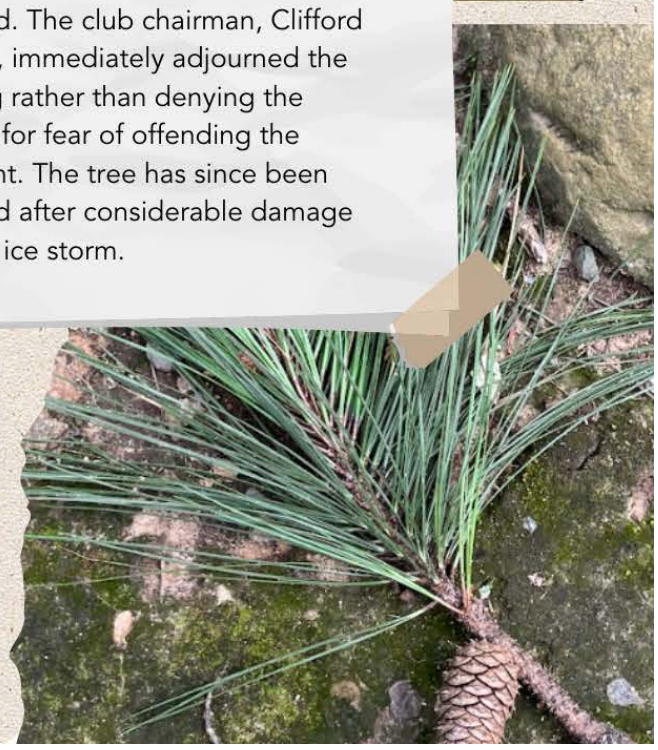
Sap contains turpentine which is antiseptic, diuretic, vermifuge, antimicrobial, and antifungal.
Pollen contains Androstenedione which can be helpful for boosting testosterone production.

- Typically reach 98–115 feet tall (tallest is 169 feet)
- Can grow over 2 feet in one year
- Irregular, thick flakey plates of bark
- Intermediate length (5-9 inches) needles in bundles of 3

Loblolly?
Loblolly is a former word of southern dialect used to describe a mudhole or mire. The name for the tree was coined because of their common growth in swampy lowlands.



President Eisenhower, a member at Augusta National Golf Club, would continually hit a specific Loblolly Pine tree (above) while playing the 17th hole of the course. At a club meeting, he once asked for the tree to be removed. The club chairman, Clifford Roberts, immediately adjourned the meeting rather than denying the request for fear of offending the President. The tree has since been removed after considerable damage from an ice storm.



- Most commercially important tree in the Southeast for timber purposes
- Second most common tree in the U.S.
- First species of Pine tree to have its genus sequenced - its genome is seven times larger than that of humans (22 billion base pairs)

Magnolia Trees

Southern, Big Leaf, and Sweet Bay

Big Leaf Magnolia
(Magnolia macrophylla)
- Leaves up to 32 inches long
- 30-40 feet tall
- Purple petal bases

Southern Magnolia
(Magnolia grandiflora)
- Thicker, leathery leaves
- Evergreen
- 60-80 feet tall
- Native to Deep South
- Located on museum property, hard to spot on trail.

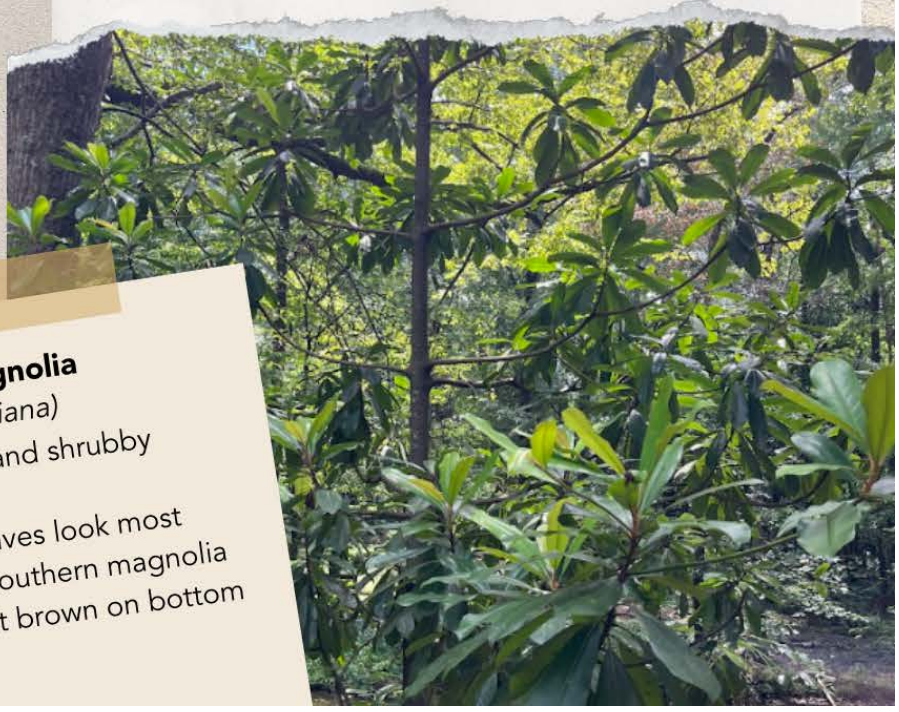
Look across the pond and see if you can spot another species of magnolia!

Genus Magnolia

- Date back to the Cretaceous Period – 100 million years ago
- Grow naturally in various parts of Asia as well as North and South America
- Named for botanist Pierre Magnol who was working to identify relationships between plants before the modern Linnaean classification system was established
- Notable similarities within the genus:
  - Similar looking petals and sepals referred to as tepals
  - Cone shaped fruit with red-orange seeds that ripen and burst out
  - Silvery smooth bark

How does speciation occur?

Speciation occurs when a group within a species is separated from other species members, and over time, their offspring become different enough that they are unique species. These differences can occur via natural selection, reduction of gene flow, or genetic drift.



Sweet Bay Magnolia
(Magnolia virginiana)
- Deciduous and shrubby
- 10-35 feet
- Flowers/leaves look most similar to southern magnolia but are not brown on bottom

Ferns

Class: Polypodiopsida

- Date back to the Devonian Period (400 million years ago), however, the ones we are familiar with today can be traced to about 70 million years ago during the Cretaceous time period
- Second most diverse group of vascular plants
- Diverse in size ranging from small filmy plants to full- sized fern trees
- Unlike most vascular plants, ferns are seedless and reproduce via spores
- Found all over the world in diverse areas, but they are most abundant in warm, moist regions

There are at least seven species of fern on the trail. See how many you can spot!

What is a spore?

Spores are single-celled units of asexual reproduction that grow on the underside of fern leaves (below). They are commonly dispersed via wind and water.

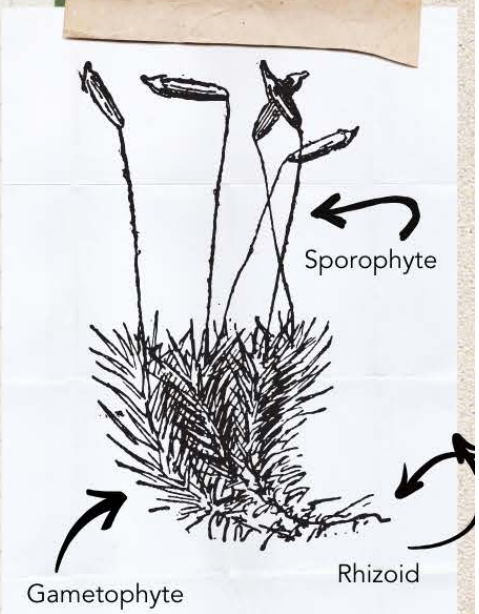
Ferns are repetitive structures. The entire fern section including the stem is called a frond. The leafy area is called a blade with each part of that being called a pinna, each part of that -- a pinnule, and each part of that -- a lobe.

Moss

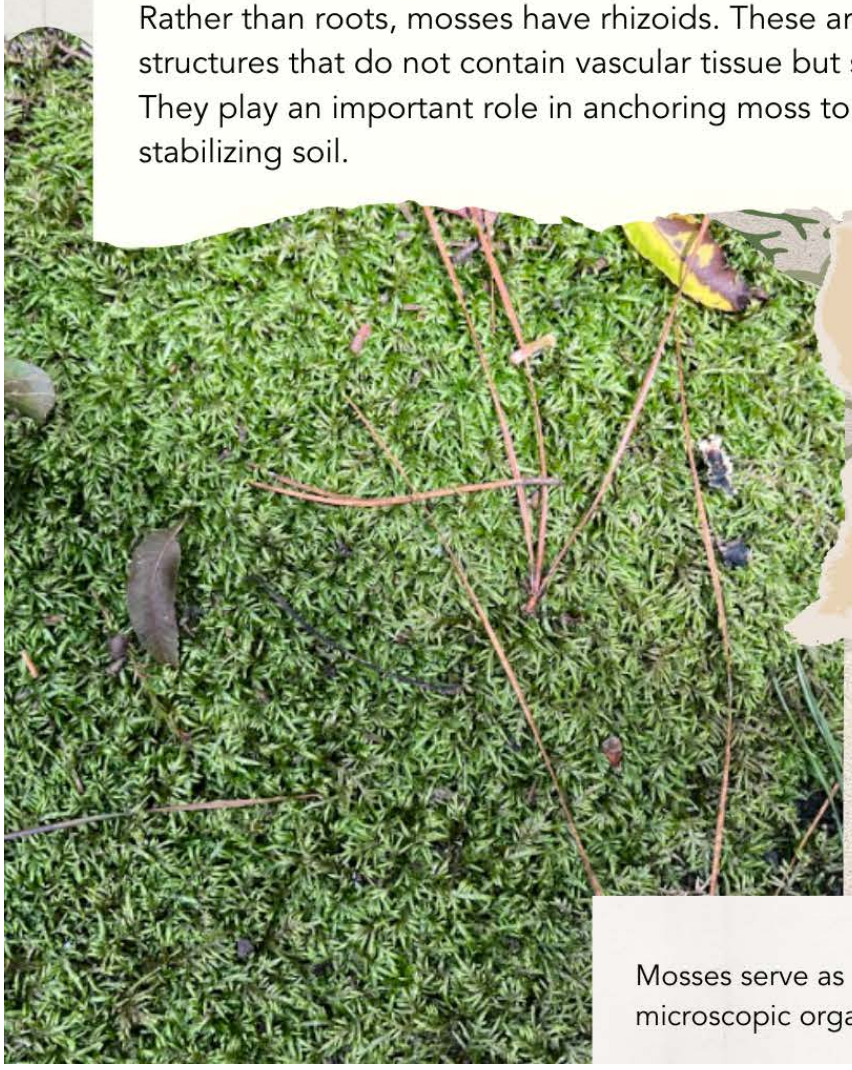
Common Mosses in Georgia include:

- Sausage Moss
- Anderson's Moss
- Tree Moss
- White Awn

- Bryophytes: seedless, nonvascular plants, primary phase is gametophyte (in most plants, the primary phase is sporophyte)
- Important modulators in water, carbon, and nitrogen cycles
- Date back 450 million years, and have survived and thrived through a range of drastic climate changes
- Composed of 15,000 – 25,000 species, they occur on every continent and in every ecosystem habitable by plants that use sunlight for energy
- Though associated with moist ecosystems, mosses have been documented in several different environments including snowy mountains and hot deserts
- After an ecosystem is devastated, mosses are among the first colonizers observed during primary and secondary succession
- By helping to stabilize soil and maintain water, mosses allow for other plants to make their way back into the ecosystem.

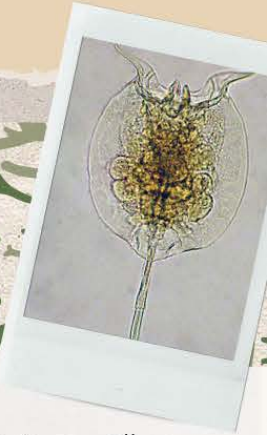


Rather than roots, mosses have rhizoids. These are filamentous structures that do not contain vascular tissue but still collect water. They play an important role in anchoring moss to its substrate and stabilizing soil.



Does moss only grow on the north side of trees?

No! While it might make sense for moss to be most common on the shadiest side of a tree, there are plenty of other things that can provide mosses the shade they need to survive in a forest. Go ahead and get a compass, so you don't get lost trying to follow this trick.



Mosses serve as microhabitats for many species of bacteria as well as microscopic organisms like nematodes, mites, tardigrades, and rotifers.

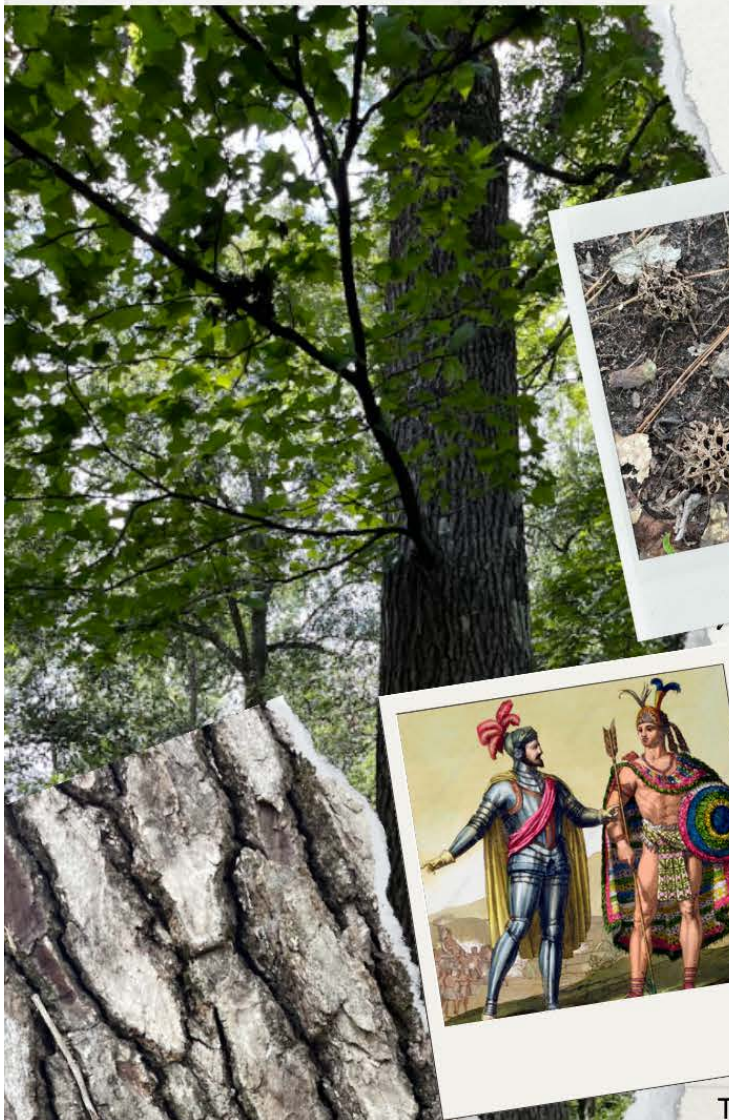
Sweet Gum Tree

Liquidambar styraciflua

The sap that the tree is named for forms a resin that can be used for chewing gum and helps to relieve cough and sore throat (a natural cough drop!)

- Common ornamental tree due to fast-growing nature and bright autumn colors ranging from bright reds to dark purples
- Five-pointed shiny and leathery leaves
- Generally 50-70 feet when cultivated but can grow up to 150 feet in the wild

Seeds contain shikimic acid, the precursor to the production of oseltamivir phosphate, the active ingredient in Tamiflu®



Produces famously spiky woody fruits (left) containing about 40 small seeds which can be dispersed via wind or animals.

It is recorded that Hernan Cortes and Montezuma (left) partook of a liquid amber extracted from a sweetgum tree during one of their meetings prior to the fall of the Aztec Empire.

Sometimes referred to as "alligator wood" due to its thick, scaly bark

The seeds are a favorite snack of a number of native bird species. See if you can spot these feathered friends hanging out nearby!

Carolina Wren

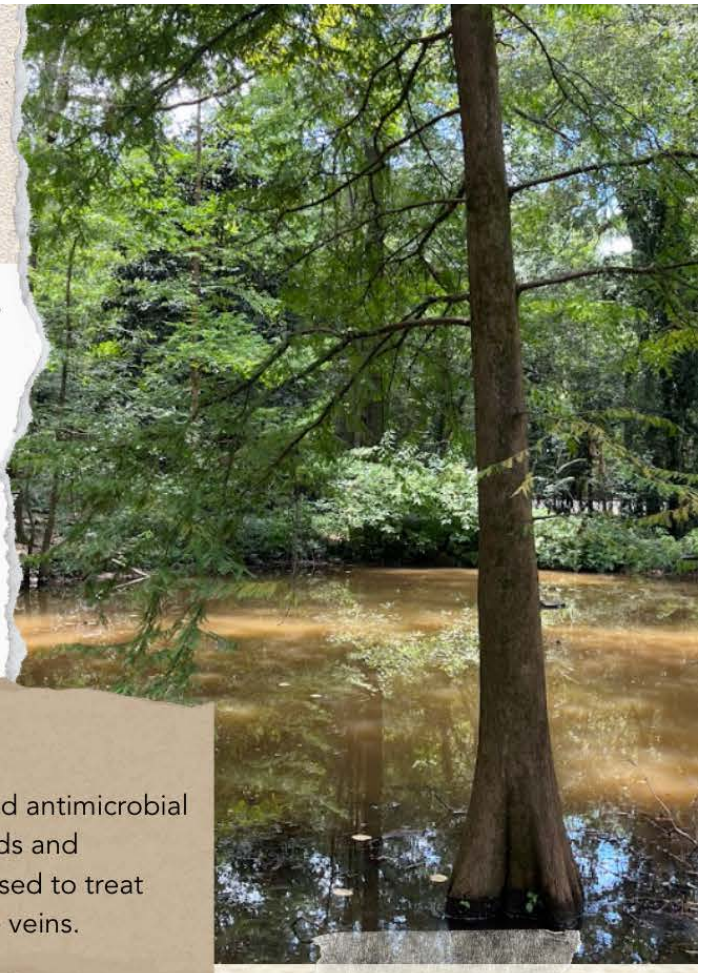
Red-Winged Blackbird

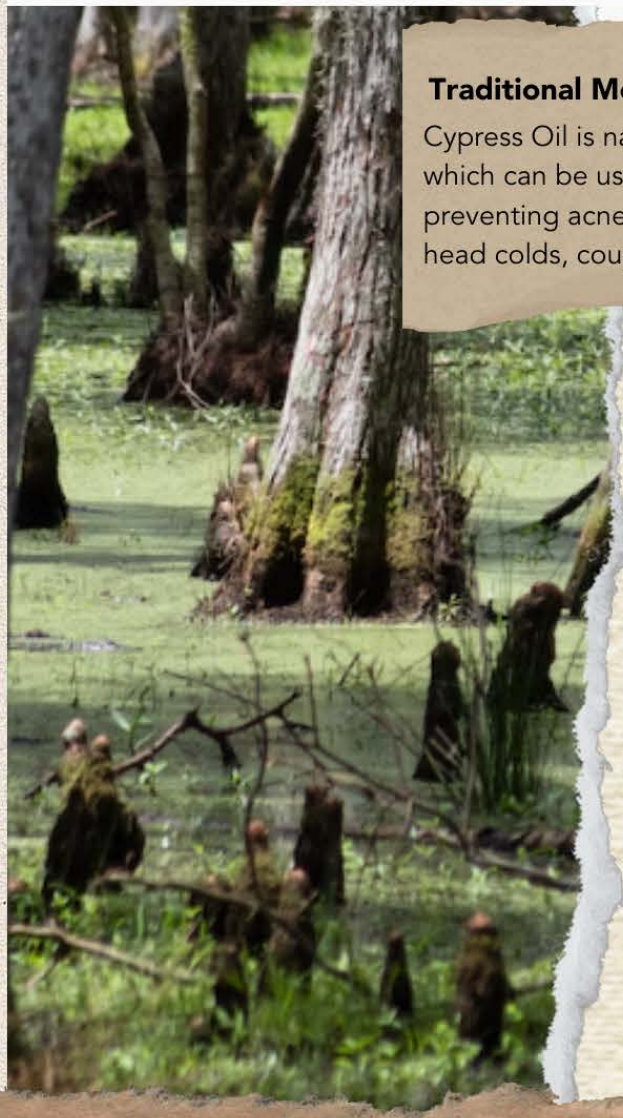
Northern Cardinal

Bald Cypress Tree

Taxodium distichum

- Unlike most conifers, they are deciduous meaning they drop their needles every year -- hence the name "bald cypress"
- Well-adapted to wet conditions like in the pond (right), but also found in dry conditions as ornamental trees
- Slow-growing and long-lived often with wide trunk bases.
- Main trunk often surrounded by multiple cypress "knees"
- Wood is rot-resistant which makes it a favorite for many purposes including barrels, railroad ties, and shingles





Traditional Medicinal Uses

Cypress Oil is naturally antibacterial and antimicrobial which can be useful for cleaning wounds and preventing acne. It is also commonly used to treat head colds, coughs, and even varicose veins.

What are those little stumps for?

Those little stumps are called 'cypress knees' and are often found surrounding bald cypress trees growing in swamps. While these formations have been studied for years, scientists aren't fully sure why they exist. There are many hypotheses:

1. Aeration
2. Methane Emission
3. Mechanical Support
4. Nutrient Acquisition
5. Carbohydrate Storage

While the aeration hypothesis has not been proven and is likely false due to the knees lack of tissues associated with pneumatophores, it is still most often cited as the purpose for cypress knees.

Common Traits of Swamp Trees

- Lack of deep growing roots
- Use of water for pollination purposes
- Ability to harness nutrients in water
- Tolerant of most acidic environments

Pneumatophores are specialized aerial roots common to many swamp plants that use spongy tissue and pores called lenticels to help with gas exchange between the plant and the air above the mud or water the plant is growing in.

Invasive Species

Kudzu and English Ivy

A species that is introduced to a new environment and subsequently harms the environment, the economy, or human health either by overpopulation or by other means is considered "invasive."

Kudzu *Pueraria montana*

- Native to East Asia but introduced to the U.S. at the 1876 Centennial Exposition alongside well known products like Heinz Tomato Ketchup, root beer, and the telephone.
- Vines can be up to 100 feet long growing up to a foot a day and often blocking out any and all sunlight that other plants may need.
- Since they are nitrogen fixing plants, they can significantly affect soil fertility, water quality, and biodiversity which are all dependent on nitrogen cycling.
- They host many agricultural diseases and insect pests including Asian soybean rust and the kudzu bug (Megacopta cribraria).
- Yearly estimates for kudzu costs in the United States range from $50 to $500 million.

English Ivy *Hedera Helix*

- Introduced to the North American gardens as an ornamental during colonial times (~1730)
- Marketed as a low-maintenance form of ground cover
- Vines up and chokes trees preventing photosynthesis as well as damaging tree bark by allowing moisture to pervade and promoting the invasion of fungal rot leading to slow death of the trees
- Reservoir for bacterial leaf scorch (Xylella fastidiosa), a pathogen that usually afflicts maples, oaks and elms
- Regularly climbs 80-90 feet tall and 50 feet wide

Named the "Kudzu King", Covington, GA's Channing Cope (right) was the most famous proponent of planting kudzu. He started the Kudzu Club of America, an organization of 20,000 members that met annually and held kudzu planting competitions. Ironically, he was named "Conservation Man of the Year" in Georgia in 1945.

What should you do about invasive species?

- Learn more about them! They will become easier to identify and distinguish from native lookalikes.
- Stop planting them. Use native alternatives like wild ginger and Christmas fern!

Stumps

Lichen, Fungi, and more!

Tree stumps are important hubs of biodiversity in any forest habitat. The exact community of life on a stump is dependent on many things including tree species, age, and degree of decay. Even so, many species of insects, fungi, and lichen make their homes in and around stumps.

Along the trail, different stumps are at different levels of decompostion. See if you can spot one with no wood rot, one with partial wood rot, and one that is almost fully decomposed. What organisms are living on each of them?

Lichen

- Symbiotic relationship between fungi and algae (or cyanobacteria)
- Mutualistic relationship – the photosynthesizer produces simple carbohydrates for the fungi, and fungi absorbs water and nutrients which are then easier for the photosynthesizer to consume
- Different types of lichen have different substrates they grow on, internal structures, and fungal components
- Many lichens also house specific types of bacteria making some structures specialized communities of organisms (even biggest than a symbiotic relationship)
- No waxy cuticle or vascular tissues like plants
- Used by environmental engineers to monitor air quality since they are highly sensitive to certain types of pollutants including heavy metals and fluorides

Fungi

- Fungi is a taxonomic kingdom composed of any organism that is eukaryotic, contains chitin in its cell walls, and uses decomposition as a means of energy.
- While mushrooms are the most recognizable form of fungi, they make up only a small portion. Unicellular yeast and many parasites are also fungi.
- As decomposers, fungi are incredibly important to ecosystems because they help return nutrients stored in dead plants (like tree stumps) and animals back to the soil where they are available for use again.
- Different fungi live on stumps during different stages of decomposition.
- Along with the large bracket fungi we often see on stumps (below), more species may be underground working to decompose the stump. This is a complex, ecologically web of mycorrhizal fungi surrounding and influencing plant roots and their nutrient uptake.

"Mycorrhizal" means fungal root. If you've ever planted something and there was a lot of white stringy stuff in the soil, that was mycorrhizal fungi.

What type is this?

3 main types of Lichen

- Crustose – grows tightly against the substrate forming a "crust" that is difficult and sometimes impossible to remove without destroying the lichen
- Fruticose – grow upright often around a central core, can form hairlike structures as well as bushes, corals, and cup-like structures
- Foliose – "leaf-like" (think foliage!) biggest of the lichen, often resembling frills of lettuce and growing in large swaths around moist environments

Fringed Campion

Silene polypetala

- Also called Eastern Fringed Catchfly
- Perennial herb
- Flowers bloom from March-May
- Flowers can shoot up up to 16 inches
- White or pink with 5 petals and leafy bracts
- Endangered species since 1991

Perrenial?

Perennial is a term used to describe plants that stay where they are for longer than one or two growing seasons. The opposite is annular plants, like dandelions (left), which don't stick around for long.

Where do they live?

Currently all fringed campion is limited to 2 geographic regions: a region beginning in Macon and moving westward through Bibb, Crawford, Taylor, and Talbot counties and a region east of the Flint river including Georgia's Decatur county as well as Florida's Jackson and Gadsden counties.

Threats

- Killed during clear cutting of forest habitat
- Overpowered by invasive species like English Ivy and Japanese Honeysuckle

How do I protect endangered plants?

- Learn about them, so you can identify them.
- Leave them alone! Don't pick them or their flowers.
- Minimize use of herbicides and pesticides.
- Plant native species when adding to your landscape.
- Avoid completely clearing areas of land.

Fringed Campion and other rare species are most often found in slope forests which are highly diverse due to their ability to house both warm temperate and cold temperate plants.

The Georgia Department of Natural Resources is currently establishing two new populations in protected regions of Monroe and Troup counties.

Walk over toward the sign straight ahead to view the Fringed Campion more closely!

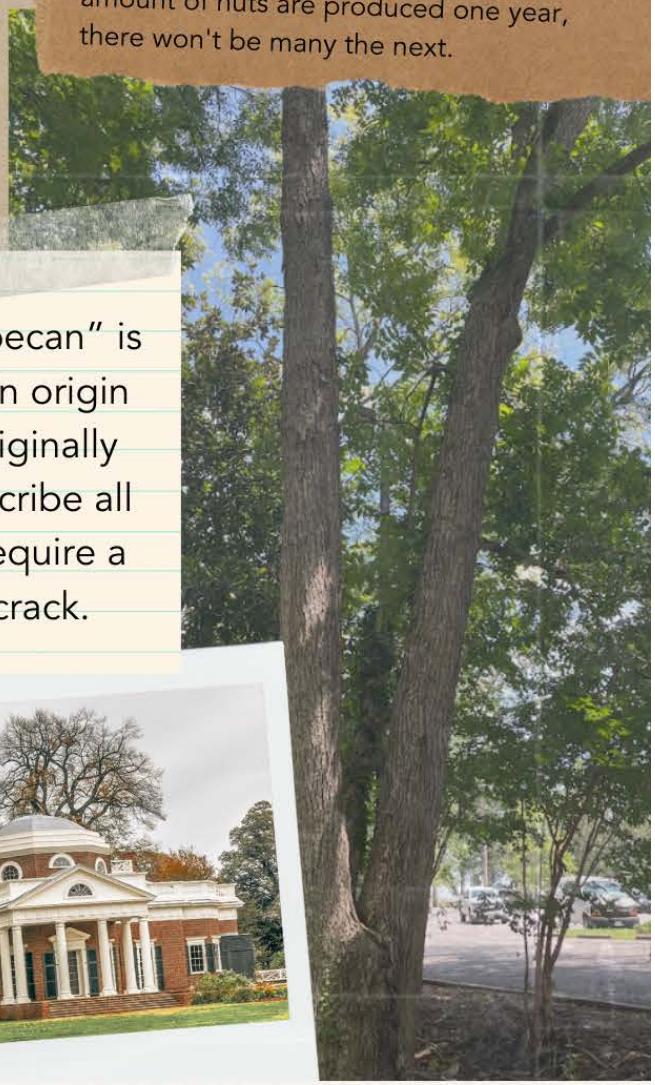
Pecan Tree

Carya illinoinensis

Pecan trees produce nuts (above) on alternate bearing years. If a heavy amount of nuts are produced one year, there won't be many the next.

- Native to most of the Mississippi River Basin
- Only tree nut native to North America
- Typically grows to 65-130 ft tall
- Leaves are alternate and pinnate with 9–17 leaflets
- Wood is often used for tool handles, drumsticks and golf club shafts

The word “pecan” is Algonquin in origin and was originally used to describe all nuts that require a stone to crack.



Now known as a classic Southern dessert, the first pecan pies were baked by French settlers in New Orleans.

President Thomas Jefferson loved pecans and grew them at Monticello (above). He often sent them to George Washington calling them Illinois nuts.

Commercial Production

- As the nation's leading producer, Georgia produces 1/3 of pecans in the U.S.
- Roughly 125 million pounds were produced in the 2022 season.

- Native Medicinal Uses:
  - Pulverized leaves used by Comanche tribes to treat ringworm
  - Kiowa tribes uses decoction from bark as a treatment for tuberculosis