NATIVE AND INVASIVE

TREES

IN SOUTHEASTERN NORTH CAROLINA

BY: ANTONIO HARTNETT

UNIVERSITY OF NORTH CAROLINA WILMINGTON

Index

Introduction

Native trees in Southeastern North Carolina are an essential part of the ecosystem. Trees provide residents with many benefits including shade on hot summer days, wood for fireplaces in the wintertime, supplies for building homes as well as providing habitat for many organisms. In Wilmington, NC, many native trees are being cut down to provide for the ever-growing population and are being replaced with invasive species. Here, native trees are usually weak competitors against the invasive species. Some of these strong competitors that are invasive include the Chinese tallowtree, Chinese privet and mimosa. Now it is more important than ever to make sure we do our due diligence in replanting natives such as the live oak, southern magnolia, redbud, or others.

Currently there are 117,000 people that call Wilmington home. In 1990, there were 56,000 residents (United States Census Bureau, 2016.). This means that over the last few decades Wilmington has more than doubled in size. When residents from out of state migrate to Wilmington, it is important to educate them on the native tree species prevalent in the area. Then, when it comes time to plant trees of their own, they will have sufficient knowledge in order plant the correct native trees, and not the invasive species that wreak havoc today.

The current trends of immigration into the Wilmington area, it is essential to ensure native plantings are re-established after bulldozing and the development of new apartment complexes. Some species, such as the red cockaded woodpecker, depend on our native trees for their survival. Not only are we planting trees to benefit our individual lives, we are also planting trees to ensure Wilmington will continue to thrive as the ecologically diverse place.

PLANT!

Species*: Pinus palustris*

Common Name: Longleaf Pine

Specific epithet: Of the Swamp

Family: Pinaceae

Fruit: Large Cone (6-8 inches)

Description: Native to the Southeastern part of the United States, the longleaf pine is a key species in maintaining the health of the endangered longleaf pine ecosystem. It is a long-lived evergreen that is fire resistant and dependent. The bark is checkered or scaly with a dark brown color. In its infancy (known as the grass stage), the longleaf pine will develop a deep taproot. This process can last anywhere from 3-15 years (Moore, 2002).

History: Before the colonial time period, longleaf pines dominated the Southeastern part of the United States occupying 92 million acres. Today, there are only 4.3 million acres left (Hoyle, 2013). Longleaf pines were primarily used for their tar, pitch and turpentine. The tar was used on masts of ships to seal out any water; as a lubricant for axels on machinery and was used on livestock to seal injuries. Pitch, which is produced after boiling tar, was primarily used on the bottoms of ships to keep them sealed. Turpentine was used primarily in the painting industry as a solvent (Walbert n.d.).

Fire Ecology: Longleaf pine forests are dependent on low intensity, frequent fires. If there are not frequent fires (3-5 years), the opportunity for hardwoods to replace longleaf pines due to it being a poor competitor arise (Moore, 2002). Fire is the great equalizer in the longleaf pine ecosystem that enables longleafs to mature, which is vital to the habitat of the red cockaded woodpecker.

Interesting Fact: A study preformed in Alabama demonstrated the resiliency of the longleaf pine in high winds when it was tested in a F3 tornado. Not only did the longleaf manage the winds, it actually thrived when compared to other, less durable trees, that would snap and break due to the high winds (Kleinman and Hart, 2017).

PLANT!

Species*: Ilex opaca*

Common Name: American Holly

Specific Epithet: Opaque

Family: Aquifoliaceae

Fruit: Drupe

Description: American holly is a native species to the United States that ranges from Texas to Massachusetts. Its preferred habitat is made up of sandy soils that are well-drained and are exposed to full sunlight. American holly has a smooth, greyish colored bark with a height of up to 30 feet. It is an evergreen with glabrous leaves that have serrations on the margin (USDA, 2002).

Uses: American Holly is best known as an ornamental plant that is used around Christmas time. It is also cultivated as a hedge for landscapes. The berries are eaten by an abundance of wildlife, however since it is a dioecious species, you need male and female trees nearby to ensure production of berries through pollination (Gilman and Watson, 1993). The berries are an attractive meal for a host of different wildlife, which promotes diversity in species that use the tree to its full ecological benefit.

Ethnobotany: The leaves of the American holly are primarily used as a diaphoretic (sweat inducing) and were used in conjunction with a host of other herbs to treat smallpox, pleurisy (enflamed membrane surrounding the lungs) and catarrh (excess mucus). American holly leaves have also been used in teas as a substitute for Paraguay tea (*Ilex paraguayensis),* which is heavily consumed in Brazil. This is due to the similar properties that both species share (Grieve n.d.).

Interesting Fact: A study published in 2012 demonstrated that, due to climate change, the range of some species of trees is actually decreasing instead of the assumed increasing. The researchers used evidence of seed size and dispersion in the different latitudes that the American holly occurs and found that 58.7% are undergoing range contraction (Zhu, Woodall, Clark, 2012).

PLANT!

Species*: Liquidambar styraciflua*

Common Name: Sweetgum

Specific Epithet: Styrax Flowing

Family: Hamamelidaceae

Fruit: Capsule

Description: Sweetgum is a native tree whose range extends from the Southeastern portion of the United States to Central America. It is hardwood that can grow over 100 feet tall, with a diameter of over five feet. It is a monoecious species with a palmate leaf that prefers moist soils in bottomlands. However, it has the ability to tolerate a variety of soil conditions. Additionally, sweetgum has a high tolerance for wind and flooding due to its deep taproot (USDA, 2002).

Uses: Sweetgum is used for many commercial wood products including plywood and paper products (Zhang, et all.,2017). Other commercial uses include lumber, pulpwood, fuel, railroad ties, as well as furniture (USDA, 2002). Sweetgum is planted as a shade tree in cities and its capsule attracts American goldfinches.

Geologic History: Geologic records have indicated that the sweetgum has 20 other extinct relatives in the *Liquidambar* genus. Remarkably, 3-4 million year old sweetgum look identical to the ones that we find today (Berry, 1919).

Interesting Facts: Currently in China, researchers have discovered a new beetle *Acanthotomicus sp.* that has become a lethal pest to sweetgum. This beetle is called the "sweetgum inscriber" for its wood boring tendencies. The fear is that this beetle will make its way into North America and become a problem for our own native sweetgum (Gao et all., 2017). The estimated value of timber loss if the beetle were to make its way into the United States would amount to 151.7 million dollars (Susaeta, Soto, Adams, Hulcr, 2017).

PLANT!

Species*: Magnolia grandiflora*

Common Name: Southern Magnolia

Specific Epithet: Large Flowers

Family: Magnoliaceae

Fruit: Follicle

Description: Southern magnolia is a native tree that ranges from Maryland to Florida, and extends west to Texas. Additionally they are found in the Pacific Northwest from Washington to California (Sheahan, 2015). This species is very diverse and can thrive in either wetlands or uplands. In a wetland, it has a high tolerance for moisture, however it cannot tolerate flooding (Sheahan, 2015). The flowers on the southern magnolia are why many people plant this tree. Not only does it attract a host of wildlife, the flowers bloom a beautiful silky white color that is aesthetically appealing. The leaves can either have a red or white underside with a pubescent feel.

Uses: The southern magnolia is primarily used as a substitute for yellow poplar due to it being a hard, dense wood. It is marketed as magnolia lumber, and is used to make furniture, pallets and veneers (Outcalt, n.d.). Additionally, it has been used in conjunction with red cedar (*Juniperus silicicola)* as woodchips for weed suppression (Ferguson, Rathinasabapathi, Warren, 2008).

Ethnobotany: Native American tribes, such as the Choctaw and Koasati, have used southern magnolias for their medicinal properties. By boiling the bark, the liquid can be poured over sores as an antibiotic, it lessens the effects of heat rashes, and opens the sinus canal for better air circulation (Taylor, 1940).

Interesting Facts: It is the state tree of Mississippi, and can grow up to 80 feet tall (Damask, 2016.). If you take the leaves of the southern magnolia and crush them in your hand, it gives off an aromatic smell that is similar to citrus.

PLANT!

Species*: Cornus florida*

Common Name: Flowering Dogwood

Specific Epithet: Flowering

Family: Cornaceae

Fruit: Drupe

Description: The flowering dogwood is a native species to the Eastern coast of the United States and its range stretches all the way west to Texas. The flowering dogwood is a medium to small sized tree with branches that usually spread wider than its height. It is found in coniferous forests, deciduous forests, swamps and floodplains. It thrives in well-drained soils with a slightly acidic pH. They are susceptible to dry soils due to their shallow root systems (Wennerberg, 2003).

Uses: The flowering dogwood is a great landscape plant because of its small size, and large canopy, which can provide plenty of shade on a hot summer day. Since the dogwood does not lose its fruit in the winter, it becomes an oasis of food for many organisms such as squirrels, birds and deer (Wagner, 2017). Other uses of the dogwood include manufacturing the wood into handles, charcoal, and golf clubs (Wennerberg, 2003). The wood is shock resistant, which means that it will not expand or contract, after it has been cut down.

Ethnobotany: The bark of the flowering dogwood has been used as an anti-inflammatory to treat muscle inflammation or sore throats. It has tonic properties and can be made into a herbal infusion to treat fevers (Lixandru, 2015). Additionally, dogwood bark was used during the Civil War by confederate soldiers to help with headaches and stopping the spread of malaria due to the amount of tannin present (Lixandru, 2015).

Interesting Facts: Sadly, a fungus known as anthracnose is wiping out large populations of dogwoods. The mortality rate of dogwoods when they obtain this fungus is 48-98% (Hadziabdic, et all., 2010).

PLANT!

Species*: Cercis canadensis*

Common Name: Eastern Redbud

Specific Epithet: From Canada

Family: Fabaceae

Fruit: Legume

Description: The eastern redbud is a native tree that ranges from parts of Canada and Northern Michigan, south to Florida, and west to New Mexico. At infancy, this tree grows a deep taproot that can develop quickly, with vertical sprouting between 10-30 feet and a crown spread of about 20 feet. It prefers low bottomland soils, and is typically one of the first trees to bloom in spring. The bloom is a fantastic array of pink to reddish purple flowers that emanate off old branches, twigs or trunks (Brakie, 2010).

Uses: Due to the small size and irregular shape of the eastern redbud, it has no commercial value (Dickson, n.d.). Instead, what the eastern redbud is typically used for is landscape and ornamental planting. This tree is great to plant along the sides of roads, driveways, and walkways due to its small size and stunning beauty when in bloom.

Ethnobotany: The bark of the eastern redbud was made into an herbal tea to treat whooping cough by the Cherokee, Alabama, Delaware, Oklahoma, and Kiowa Native American tribes. The roots were used to treat congestion and fevers (Immel, 2001).

Interesting Fact: When compared to the Mexican redbud (*Cercis canadensis var. mexicana)* for the amount of leaf cutter bees present on the leaves, the eastern redbud was found to have 17 times more bees than the Mexican redbud. This is thought to happen because of the larger surface area and lower toughness of the eastern redbud leaves (Eigenbrode et all.,1999).

PLANT!

Species: *Quercus virginiana*

Specific Epithet: From Virginia

Common Name: Live Oak

Fruit: Acorn

Family: Fagaceae

Description: This oak is native to North America and ranges from Virginia to Texas, predominately near the coastline. This is a medium to large tree (75 feet), with an even wider crown spread that can cover up to 150 feet. Some of the older live oaks can have trunks that are over 10 feet wide with a buttressed base. It prefers woodlands, savannahs and grassland habitats with a slightly damp soil. However, this tree can tolerate drier conditions as well. Additionally, this tree can withstand short periods of flooding and is tolerant of salt spray and excess salts in the soil (Goldman, 2016).

Uses: Native American tribes and early settlers would soak the acorns to extract the tannin to make grits, flour or roasted nuts (Coder, 2008). During the colonial era, live oak would be used primarily for shipbuilding. Its dense, stable, slightly curved branches were perfect for making ship hulls. Additionally, it was used for many tools and furniture. Today, the live oak is primarily planted as an ornamental tree, with the tree typically being a centerpiece for a landscape (Whittlemore, 2017).

Interesting Facts: The frigate USS Constitution, nicknamed "Old Ironsides," had its hull made of live oak. In the War of 1812, she engaged H.M.S. Laurant on the water. Old Ironsides crushed the Laurant's hull made of longleaf pine, which is a much softer wood (Coder, 2008). North Carolinas state champion live oaks are both located in New Hanover County. The first live oak has a height of 128 feet, and a crown spread of 104 feet. The second live oak has a height of 87 feet, and a crown spread of 121 feet (North Carolina Forest Service, 2017). Live oaks are also susceptible to gall making arthropods, which decreases the aesthetic and commercial value of these trees (Bird, Melika, Nicholls, Stone, Buss, 2013).

DON'T PLANT!

Species*: <u>Sapium sebiferum</u>*

Specific Epithet: Having Wax

Common Name: Chinese Tallowtree

Fruit: Capsule

Family: Euphorbiaceae

Description: The Chinese tallowtree is an invasive species from China. It is a small to medium sized tree that has become a nuisance in the Southern United States because it replaces natural vegetation easily. Generally, it is found in swampy lowlands, however it can invade highlands, outer margins on bodies of water and can tolerate some salinity. They grow best in full sun but can tolerate shade as well. Due to the tallowtrees ability to tolerate many different kinds of soil conditions, it rapidly overtakes natural vegetation and produces toxins that are deadly to cattle (Urbatsch, 2000). It is resistant to drought, flooding, fire, cold, bacteria, nematodes, virus, fungi, beetles and other insects, which is why it has become such an invasive pest throughout Southern United States (Oliver n.d.).

Control Efforts: Currently, tests are being performed to see if the flea beetle (*Bikasha collaris)* would be a capable biological agent to unleash on the tallowtrees (Wheeler et all., 2017). Some herbicides that have been tested on the tallowtree include triclopyr amine and ester formulations, imazamox, aminopyralid, aminocyclopyrachlor, and fluroxypyr (Enloe, Loewenstein, Streett, Lauer, 2015). However, these herbicides have proven to be not that successful.

Interesting Facts: An urban legend exists that Ben Franklin introduced the Chinese tallowtree into the United States, however genetic tests have proven this false (Weisman, 2011). It is true that Ben Franklin did have tallowtrees, however the descendants of those trees are very miniscule in number. The majority of tallowtrees entered as seeds in the early 1900s by United States federal biologists. The United States was interested in their commercial value as a potential oilseed crop. However, the tests failed and the tallowtree stayed behind (Weisman, 2011). Today, it is one of the most invasive species of trees in the United States.

DON'T PLANT!

Species*: <u>Ligustrum sinense</u>*

Common Name: Chinese Privet

Family: Oleaceae

Specific Epithet: From China

Fruit: Drupe

Description: Chinese privet is an invasive species from China that was originally cultivated as an ornamental plant. It is typically under 30 feet tall and shrub like. It has a very extensive root system that is shallow. It is considered an evergreen and is present from New England, to Florida and as far west as Kansas. It is resistant to many types of soils and can survive in wet or dry areas. Typically it is found on the edges of forests or streams where it creates monocultural thickets (Meyer, 2011).

Control Efforts: Chinese privet has shown to have a decline in numbers where exotic earthworms (*Aporrectodea caliginosa, Lumbricus rubellus,* and *Octolasion tyrtaeum)* are present. These earthworms were able to remove 70% of the privet that they encountered and helped bring back natural vegetation and decrease soil pH (Lobe, et all., 2014). Removing privet from the environment that it inhabits is beneficial to plant communities and it promotes biodiversity and secondary succession (Hudson et all., 2014). Currently, there is no large-scale biological agent that can be administered to fight against the spread of privet (MacDonald et all., 2008). The best way to control privet is by physical or mechanical means. Using a chainsaw to cut the base of the tree, and then pulling out the roots, because it can stump sprout, is the best way to control this pest (MacDonald et all., 2008).

Interesting Facts: Chinese privet is not only an invasive and hard to manage, it is also a toxic tree. The leaves and the berries are toxic and can cause abdominal pain, diarrhea, headaches, and clammy skin that can last for up to 72 hours (Sullivan, Yan, Beckers, n.d.). Additionally, Chinese privet has been found to increase decomposition rates of leaf litter (Mitchell, Lockaby, Brantley, 2011).

DON'T PLANT!

Species*: <u>Albizia julibrissen</u>*

Common Name: Silk tree/Mimosa

Family: Fabaceae

Specific Epithet: Iranian Name for Silk tree

Fruit: Legume

Description: The silk tree is an invasive species that is originally from Asia. It is a deciduous tree that is usually smaller than 40 feet tall. The silk tree is a very adaptive tree that can thrive in all kinds of soil conditions. They are predominately found on the edges of roads, or in vacant lots. They cannot tolerate full shade so they are not found in forests with heavy canopies. The silk tree is a problematic species because it is a strong competitor to the native trees that inhabit the Southeastern part of North Carolina. When it is found in dense sites, this tree can suck up all the nutrients and sunlight (USDA Forest Service, 2004).

Control Efforts: The main way to control the spread of this species is through hand pulling and cutting down existing silk trees. After they have been cut down, it is important to maintain the site that they were exterminated from in case regeneration through stump sprouting occurs. Other ways to maintain the spread of silktrees is through chemical or biological agents (Taggart eta all., 2015). Research is still needed to determine which biological agent works the best, but the two that are currently in testing include a root fungus and a beetle (Invasive Species Compendium, 2017).

Interesting Facts: The silk tree was brought into the United States in 1745 as an ornamental plant (Remaly, 2005). Due to its showy flowers, it was planted without thought and quickly spread across eastern and southern United States. It was first introduced into Europe by Filipo de Albizzi, who was an Italian nobleman. Shortly there after, the silk tree was introduced into North Carolina by Andre Michaux (Deane, 2011). Andre Michaux is known for his study on flora in North America where he was the first one to compile a list of all flora in the eastern United States (Encyclopedia Britannica, n.d.).

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