



Evaluating Wetland Regeneration Dynamics of Chinese Tallow and Native Species Across Wetland Mitigation Bank Microsites

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Introduction

Bottomland hardwood forests are some of the most diverse and important ecosystems in the southeastern United States. However, due to the nature of the alluvial floodplains in which they occur, they are extremely susceptible to Chinese tallow (*Triadica sebifera*) invasion.

Chinese tallow is the most invasive species in the SE U.S. and can significantly alter the stability of an ecosystem if not properly managed. It's ability to invade and establish itself however is heavily dependent on the vulnerability of the ecosystem and the competitiveness of the native species present.

This study will address the many shortcomings in Chinese tallow research, specifically the lack of data regarding the viability of using artificial native species to combat Chinese tallow and how natural native regeneration competes with tallow in areas that it has previously been treated for.



Figure 1: Chinese tallow seedlings (left) and monotypic tallow stand after invasion (right)

Goal and Objectives

Goal:

To identify native tree species that have the potential to successfully compete with Chinese tallow across varied environmental conditions in southern bottomland hardwood forested wetlands.

Objectives:

- Quantify natural regeneration dynamics of native species and Chinese tallow across microsites of varied conditions via a paired plot design
- Determine environmental ecophysiological effects of natural and artificially planted native species and Chinese tallow through biomass partitioning analysis across microsites to develop specific management practices based on abiotic factors

Methods

The study site is located at the Green Bayou Wetland Mitigation Bank (GBWMB) and is part of the Harris County Flood Control District (HCFCD) planting project in Harris County, Texas. This site holds a variety of microsites, making it ideal for testing the effects of various abiotic factors found where bottomland hardwood forests can occur.

This study will use sites created based on varying gradients of light, hydrology, and soil. This project will use these locations to create a paired plot design and measure regeneration dynamics of native species and Chinese tallow.

Green Bayou Wetland Mitigation Bank HCFCD Planting Project in Harris County, Texas



Figure 2: Boundary map of the GBWMB in Harris County, Texas with plots and flood regimes

- Paired plot locations will be determined via a random azimuth 20 meters from established gradients in a naturally regenerating area
- Two plots will be established per azimuth designation, totaling 40, and will have an area of 2 x 2 meters (6.6 x 6.6 ft) per plot
- Regeneration data of seedlings and saplings in each plot will be evaluated for:
 - Composition
 - Height and Diameter
 - Height to live crown ratio
 - Percent of normal foliage and crown dieback
 - Occurrence of browse
 - Vigor class
- Additionally, 10 to 20 stems of native species and tallow will be destructively sampled to measure stem radial growth and age
- Biomass partitioning of seedlings and saplings will be measured through root-shoot ratios of native species across microsites

Four native tree species have been selected for competition study based on a mixture of both shade and flood tolerance. These species include water oak (*Quercus nigra*), water tupelo (*Nyssa aquatica*), bald cypress (*Taxodium distichum*), and loblolly pine (*Pinus taeda*).

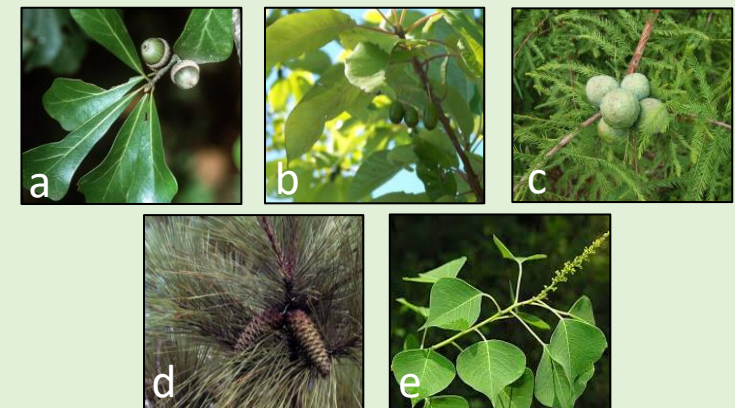


Figure 3: Visual representation of species being studied: water oak (a), water tupelo (b), bald cypress (c), loblolly pine (d), and Chinese tallow (e)

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