2002

Investigating the Competitive Influence of Chinese Tallow (Triadica sebifera) on the Morphology

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Investigating the Competitive Influence of Chinese Tallow (*Triadica sebifera*) on the Morphology and Physiology of Artificially Regenerated Oak (*Quercus* spp.) Species

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Since its introduction in the mid-1800s, Chinese tallow (*Triadica sebifera* (L.) Small [formerly *Sapium sebiferum* (L.) Roxb.]; *Triadica* hereafter) has naturalized and often forms monospecific stands, frequently replacing native species. Because of this, research is needed to determine the competitive influence of *Triadica* on desired native woody species. In 1996, a wetland mitigation study identified that control of *Triadica* was important during site preparation in southeast Texas. However, the long-term effects of *Triadica* competition have yet to be identified. This study used a novel approach at quantifying the competitive influence of *Triadica* on planted oak (*Quercus* spp.) species in a wetland mitigation area. Using ESRI ArcInfo® 9.3, each competitor stem was plotted respectively to an oak species used as plot center for a 1/100th acre plot. Each tree, planted oak, and the competitors had a buffer area implemented using ArcInfo 9.3 using the predetermined competition radius factor (CRF). The area of overlap was then determined through geometry calculations in ArcInfo 9.3, and competition quotient was compared across plots and sites, where the area of overlap was assumed to be the competitive ability of the tree. Regression analysis was employed to study the relationship between the competition quotient, as the dependent variable, and the independent variables of dbh, mean distance to competitors, mean distance to *Triadica*, live crown ratio, total number of competitors, total basal area of all competitors, total number of only *Triadica* within the plot, and total basal area of only *Triadica*. Photosynthesis measurements were also measured on pairs of plots with opposed competition quotients. Only 37.4% of the competition quotient for all competitors could be explained using the independent variables across all sites and plots. Oaks associated with opposing competition quotients were similar in net photosynthesis, but stomatal conductance and transpiration were greater in plots with high competition quotients for cherrybark oak (*Quercus pagoda*) and willow oak (*Quercus phellos*). Therefore, measures taken did not assess the competitive influence of *Triadica* or other naturally regenerated competitor tree species on planted oaks.