

Restoration of Oaks & Hickories in the Blackland Prairie: Investigating Causality of Planting Failures/Successes

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Description:

Mast-producing trees in the Blackland Prairie have been gradually replaced by more shade-tolerant species. A split-plot design was installed, to test canopy coverage and competition control effects on survival of oak and hickory seedlings. A greenhouse experiment examined flooding and drought impacts on plant water relations.

Abstract:

Mast-producing trees in the bottomland forests of the Blackland Prairie ecoregion have declined in abundance. Oaks and hickories have been replaced by more shade tolerant species, including green ash and sugarberry. Recent trials at Richland Creek Wildlife Management Area (RCWMA) in Freestone County, Texas showed low survival of oaks and hickories planted beneath existing canopies and in reduced canopy environments. A split plot experiment design was installed on three sites at RCWMA, studying the effects of canopy coverage and competition control on survival and growth of bur oak, Shumard oak, and pecan seedlings. Uprooting by hogs shortly after planting resulted in >90% mortality of pecan on two sites. Year one survival of Shumard oak was significantly higher than bur oak. However, bur oak was more preferred by hogs than Shumard oak. Year one growth of bur oak was significantly greater than Shumard oak. A greenhouse experiment was established using the same species to study the effects of flooding and drought common to the region, on photosynthesis and water relations of each species. Current studies at RCWMA have shown pecan to be tolerant of long-term flooding, even into the growing season. In the first phase of the greenhouse experiment, photosynthesis rates for seedlings in the flooded treatment were compared to rates of seedlings in the control, receiving regular watering. Pecan seedlings had greatest mean photosynthetic rates of the three species in the flooded treatment. Mean rates were similar for bur oak and pecan in the control.