

# Hickory and Oak Growth Over 10 Years in Response to Initial Fertilization<sup>1</sup>

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**Abstract.** Planted ground covers can compete strongly with planted tree seedlings, hindering reforestation efforts. Fertilization may benefit both trees and ground cover, but its effects on the balance of these competitive interactions are unclear. A 3x3 factorial experiment with 3 levels of fertilizer application and 3 seeding rates was established in 2006 to test for differences in tree seedling growth and survival, and for differences in ground cover establishment and composition. Treatments were applied by hydroseeding a mixture of native warm-season grasses, annual ryegrass and Korean lespedeza at around 6, 30, or 60 kg/ha, along with 10:20:20 water soluble fertilizer at rates of 1, 224, or 448 kg/ha. Bare-root, 1-0 tree seedlings of scarlet oak, white oak, black walnut, and mockernut hickory, along with mockernut hickory seed, were planted on an 8x8 foot spacing. Tree growth and survival, and ground cover establishment have been monitored. After seven years, white oak survival was consistently good across plots with an overall average of 69% and hickory was consistently poor across plots with less than 5% survival. Survival of scarlet oak and black walnut was highly variable, averaging 46% and 33%. After 10 years the plots had reached canopy closure. Survival was similar to the previous sampling period; white oak survival was 71%, scarlet oak was 51%, and black walnut was 36%. More hickory was recorded in 2016 than had been previously, with survival rates of 10% for hickory planted as seed and 6% for hickory planted as seedling. White oak diameter averaged 49 mm in plots with the highest fertilization rate, compared to 43 mm in plots receiving less fertilizer.

Additional keywords: hardwoods, Quercus, Carya.

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  3. Work reported here was conducted near 36° 29' 34" N; 84° 17' 05" W.