

UPLAND OAK AND MESOPHYTE SEEDLING MORPHOLOGICAL TRAITS IN RESPONSE TO PRESCRIBED FIRE

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Abstract—Morphological traits of upland oak (*Quercus*) seedlings are a direct expression of resource allocation, and fire is believed to alter resource allocation. There have been few studies in upland oak forests that identify a relationship between above- and below-ground traits of seedlings in response to fire. The objective of this study was to quantify species distribution of resources to various structural components, and whether oaks or shade-tolerant, fire sensitive species (i.e., mesophytes) differ. To address this issue, we chose seven species in Kentucky, which included upland oaks (*Q. alba*, *Q. coccinea*, and *Q. montana*) and hypothesized mesophytes (*Acer rubrum*, *A. saccharum*, *Carya glabra*, and *Fagus grandifolia*) that were sampled in various fire treatments (unburned, 1x, 2x, and 3x burned). In the field, environmental variables such as canopy cover and soil organic layer depth and seedling traits such as height, basal diameter, and root collar were measured before seedling harvest; lab procedures included measurement of specific leaf area, leaf thickness, and nitrogen content to understand photosynthetic capabilities, along with the development of allometric equations for linking above- and below-ground traits. We hypothesized oak species will allocate more resources to below-ground structures with increased fire treatments compared to mesophytes due to oaks' physiological and morphological traits to withstand fire. This research could contribute to the further understanding of oak regeneration response to prescribed fire and the pattern of resource allocation between oaks and mesophytes.

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