

Prescribed Fire Effects on Foliar Nutrients, Photosynthesis, and Growth of Ridgetop Maple and Oak Seedlings

*N.L. Gilbert, M.A. Arthur, S.L. Johnson, S.K. Gleeson and B.A. Blankenship
University of Kentucky, Lexington, KY*

Forest management with low-intensity prescribed burns aims to promote oak regeneration in upland forests of the Cumberland Plateau, where sixty years of fire suppression coincide with increasing red maple abundance. Our objective was to determine whether a single fire influences the ecophysiology of red maple, chestnut oak, and scarlet oak seedlings during the first year postburn. On a burned (March 1997) and an unburned ridgetop site, we measured foliar nutrients (N, P, K, Mg, and Ca) monthly during the 1997 growing season, photosynthesis at five light intensities (0, 100, 400, 1000, 1500 $\mu\text{Em}^{-2}\text{s}^{-1}$) in July, 1997, and stem diameter and height in May, 1997, and March and May, 1998. For all species, foliar N, P and K, net photosynthetic rates, and diameter and height relative growth rates were significantly higher on the burned site than the unburned site. Fire had little effect on the relative ecophysiology among species on the burned site compared to the unburned site. These data suggest that single low-intensity prescribed burns will not benefit the regeneration of oaks by enhancing their ecophysiological performance over that of red maple.

Chilton Creek: A Case Study of Landscape Fire Effects

George W. Hartman¹ and Blane Heumann²

¹Fire Ecologist, Missouri Department of Conservation, 1110 S. College Ave., Columbia, MO 65201, ²Lower Ozarks Preserves Manager, The Nature Conservancy, Missouri Ozarks Office, P.O. Box 960, Van Buren, MO 63965

The Chilton Creek Management Area is 5,657 acres located in Carter County, Missouri on the Ozark Plateau. Owned and managed by The Nature Conservancy, a 2,500-acre portion is divided into 5 burn units with a fire return interval for the various units from annual to 4 years. The major objective of the studies is to document the effects of landscape-scale prescribed burning on the naturally occurring communities of the Ozark woodlands. Fuel loading, fire behavior, fire intensity and coverage measurements are also being recorded to relate fire activity to resource response. Prescribed burning was initiated spring, 1998.

The study to document fire effects on the herbaceous and woody components is being conducted cooperatively with the Missouri Department of Conservation. Nested plots (250) and sampling protocols mimic an adjacent long term study of timber harvesting techniques called the Missouri Ozark Forest Ecosystem Project (MOFEP). Prescribed fire management will be compared to even aged timber management, uneven aged management and controls (no active management).

Other studies being conducted with the restoration burning include stream hydrology and biota, differential mortality of young woody species, breeding bird populations, herpetofauna, lichens, invertebrates including land snails and Orthoptera, soils, geology, and ecological land classifications.