A SHELTERWOOD-BURN TECHNIQUE FOR REGENERATING PRODUCTIVE UPLAND OAK SITES IN THE PIEDMONT REGION

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ABSTRACT

Regenerating oak stands on productive upland sites is widely recognized by foresters as a major problem in hardwood management. Recent research indicates that oak regeneration is more resistant to surface fires than are its primary competitors on these sites if burning occurs 3–5 years after a partial overstory harvest. This combination of cutting following by fire (shelterwood-burn technique) mimics natural disturbances that have occurred in eastern North America for millennia and appears to be a viable approach to regenerating oaks on productive upland sites. This paper presents silvicultural guidelines for applying the shelterwood-burn technique on productive upland sites and discusses its benefits for private landowners and resource professionals.

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THE ROLE OF FIRE, CANOPY GAPS, AND DEER BROWSING IN FOREST REGENERATION IN SECOND-GROWTH STANDS: PRETREATMENT RESULTS

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ABSTRACT

Dendrochronological and palaeobotanical studies show that species composition in many eastern deciduous forests is changing at unprecedented rates. Two notable examples are an increase in red maple (*Acer rubrum)* saplings and a decrease in red oak (*Quercus rubra)* saplings. Researchers have studied this phenomenon for decades and identified possible explanations, but generally have failed to find definitive causes. Three likely explanations for the shifts in species composition are: (1) disruptions in natural fire regimes, (2) overbrowsing by large deer populations, and (3) changes in understory light environments. We are beginning a 10-year study that simultaneously examines these 3 major influences on forest regeneration in mature, second-growth, mixed mesophytic forests in West Virginia. Our first hypothesis is that fire shifts species composition by promoting fire-tolerant species. The second hypothesis is that browsing by large deer populations prevents preferred (or palatable) species from entering the sapling size class. Last, we propose that species characterized as being intermediately shade-tolerant regenerate in intact stands via canopy gaps. We are testing these hypotheses in 128 20 × 20-meter experimental plots among 8 stands in Randolph and Tucker Counties, West Virginia, where all trees ≥20 centimeters in height have been mapped and measured. Pretreatment results show that *Quercus* species fail to reach sapling size at both study sites, and *Acer* species saplings dominate. Further, analyses on understory light levels show that *Q. rubra* seedlings (which are intermediate in shade tolerance) occur at low densities in stands with high leaf area index and high canopy closure. In our 10-year factorial experiment, begun in 1998, we will conduct controlled burns, exclude deer, and cut canopy gaps.

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