THINNING AND BURNING TREATMENTS INFLUENCE WITHIN-CANOPY LEAF TRAITS IN SEVEN HARDWOOD SPECIES IN OHIO

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Leaf nitrogen content (LN, %) and leaf mass per area (LMA, g m^{-2}) are important features that are closely linked to the photosynthetic performance of plants. Hence, models of ecosystem carbon balance often incorporate both leaf traits in simulations of potential net primary production. Forest management practices such as burning and thinning may change stand structure and soil dynamics, resulting in the changes in LN and LMA. For simulations at a larger spatial and temporal scale, additional information on species specific leaf traits and their plasticity to changing environments is needed. Our goal is to ultimately model the net effect of carbon sequestration under the future species rearrangement. The objective of this study was to understand how LN and LMA of different canopy tree species (*Quercus alba* L., *Q. coccinea* Muenchh., *Q. prinus* L., *Q. velutina* Lam., *Carya* spp., *Acer rubrum* L., *Liriodendron tulipifera* L.) responded to thinning and/or burning treatments; and different landscape and soil properties in southern Ohio. We selected five trees for each of the seven species at each of the 12 experimental units (three replicates of control, thin, thin + burn, and burn treatments) of the Fire and Fire Surrogate (FFS) study. Leaves from the top and bottom of the crown profile were collected (N = 850) in the summer of 2003. We found significant effects (positive) of FFS treatments on LMA for most species at the bottom of the tree crown. FFS treatments also significantly increased LN of *Q. coccinea* and *L. tulipifera* at the bottom of the tree crown. Sun leaves showed consistent LN and LMA regardless of FFS treatments. Regression tree analysis showed no effects of landscape features and soil properties on LN and LMA. Interspecies differences accounted for most variations of LN and SLM. Our study suggested FFS treatments increased the net primary production of leaves at the lower crown position. Different species tended to retain their respective LN and SLM under different landscape and soil features. This finding will facilitate our efforts to model the impacts of future species redistribution of ecosystem carbon balances.

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