IMPACT OF FIRE, SILVICULTURAL MANIPULATION, AND MICROSITE CONDITIONS ON WOODY DEBRIS DECAY DYNAMICS IN A MIXED-OAK FOREST

Darrin L. Rubino[1†], Lindsey E. Hesch[2], and Brian C. McCarthy[3]

Woody debris (downed limbs and boles) is an important component of forested ecosystems. It serves as habitat for a wide variety of organisms and plays an important role in nutrient cycling and dynamics. However, little is known about the wood-decay process, especially in the topographically complex mixed-oak forests of Eastern North America. The goal of this investigation was to determine how fire and silvicultural management affect the decay rate of woody debris by using wood blocks cut from commercially available native lumber. This study was conducted in Zaleski State Forest in southeastern Ohio (an Ohio Hills study site in the long-term Fire and Fire Surrogate study). Following silvicultural treatment and burning, wood blocks of "red" oak (*Quercus* L. subgenus *Erythrobalanus*) and "white" oak (*Quercus* L. subgenus *Lepidobalanus*) were placed on the forest floor in burned, thinned, thinned + burned, and control (no manipulation) units. In each unit, blocks were placed in xeric, e.g., ridges and southwest-facing slopes, and mesic, e.g., valleys and northeast-facing slopes, microsites to also investigate the impact of moisture availability on the decay process. Site moisture availability was determined using the integrated moisture index. After 27 months of decay, mean mass loss was significantly ($P < 0.05$) greater for red than white oak. Mean mass loss was 51.9 ± 1.7 (SE) percent for red oak and 36.3 ± 1.3 percent for white oak. Using a two-way ANOVA to compare the mean percent mass loss in each unit, microsite, and microsite × unit combination revealed no significant differences in decay rate for white oak. Alone, microsite and unit had no significant affect on decay rate in red oak. However, the microsite × unit interaction was observed for red oak. The fastest decay rates were observed in mesic microsites in the thin + burn unit and the slowest in the mesic microsites in the thinned unit. Decay dynamics appear to be species specific and fire and silvicultural manipulation may lead to complex changes in decay dynamics in topographically dissected mixed-oak forests of Eastern North America.

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[1]Assitant Professor of Biology, Biology Department, Hanover College;
[2]Graduate Assistant, Botany Department, Miami University of Ohio;
[3]Professor of Forest Ecology, Department of Environmental and Plant Biology, Ohio University; [†]Corresponding author, P.O. Box 890, Hanover, IN 47243-0890, 812-866-7247, email: rubino@hanover.edu.