

Top Contributors to Understory Plant Biomass in Intensively-managed Pine of East-central Mississippi

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Abstract: Fire and selective herbicides with imazapyr may enhance wildlife habitat in mid-rotation, intensively-managed pine (*Pinus* spp.) by removing hardwood competition and releasing shade-intolerant plants. However, well-established plant species, uncontrolled by fire and imazapyr (e.g., *Rubus* spp.), may dominate and thereby limit plant species diversity. Therefore, we examined plant biomass in stands managed via prescribed burning and imazapyr on Weyerhaeuser NR Company land in east-central Mississippi during 1999–2009 to determine top contributors to understory biomass. We used a randomized complete block design of six blocks (pine stands) with treatments (burn, herbicide, burn + herbicide, control) assigned randomly to each of four, 10-ha experimental units per block. We applied Arsenic (Imazapyr) September 1999 by skidders and conducted prescribed burns during winter 2000, 2003, and 2006 using drip torches. We clipped all plants <1.3 cm diameter arranged diagonally across each experimental unit within 10, 1-m² hoops in July 1999–2000 and 20 1-m² hoops July 2001–2008, placed them in paper bags, dried them at 80 C until constant weight, and weighed them. We designated top contributors as plant species located before the horizontal asymptote on a graph of cumulative weight by species rank with the greatest biomass contributor ranked first and the asymptote representing minimal weight contribution. We used a repeated measures mixed models analysis of variance to test for differences among treatments within years, interaction terms, and differences within treatments if we detected a significant interaction for mean biomass of each top contributor. Ninety-two top contributors of 390 collected species comprised 95% of total plant biomass. Of these, six species (*Rubus argutus*, *Lonicera japonica*, *Chasmanthium laxiform*, *Toxidodendron radicans*, *Vitis rotundifolia*, and *Rubus furvulus*) comprised 55% and may have outcompeted other species, restricting plant diversity and treatment impact on understory plant release. When assessing treatment options, managers should consider selecting treatments that will effectively reduce highly competitive plant species prior to treatment application to enhance post-treatment plant species diversity.

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