

The Influence of Prescribed Burning and Timber Harvest on Acorn Pilferage

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Introduction

- Oak regeneration failure observed throughout eastern US
 - Understory conversion to maple and beech
 - Likely due to changes in disturbance regime
- Timber harvest and prescribed fire promote oak regeneration
 - Shelterwood harvest allows for intermediate light
 - Fire reduces oak competition
- Many trophic interactions between wildlife and oak
 - Acorn/granivore interaction important for regeneration
 - Granivores consume and cache



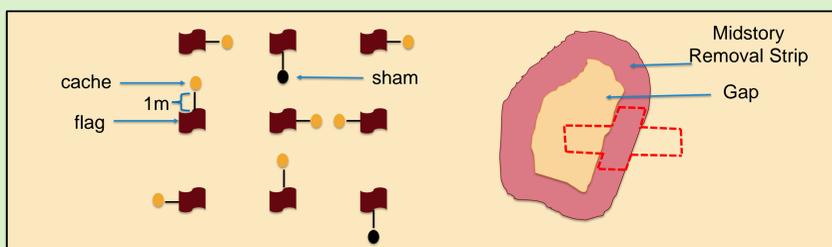
We investigated how 2-stage shelterwood harvests and prescribed fire influence acorn pilferage rates

Prediction: Overwinter acorn pilferage will be lower inside harvest gaps and in unburned sites

Hypothesis: Granivores will perceive sites with lower cover as more risky

Methods

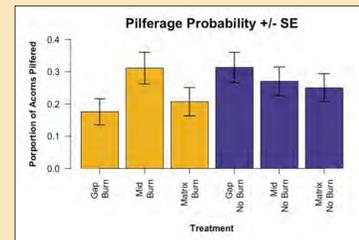
- Acorn Detection
 - Acorns tracked with neodymium magnets
 - Magnets used to determine cache fate without disturbing the cache multiple times
- Grid Design and Cache Creation
 - Burned and unburned 2-stage shelterwood
 - 4 gaps per treatment
 - 75 acorns per gap
 - Matrix and Gap: 11 x 3 grids
 - Midstory: adjusted grid
 - Acorn cached in random cardinal direction from grid flag and sham caches
- Microsite Data collected at every cache



Results

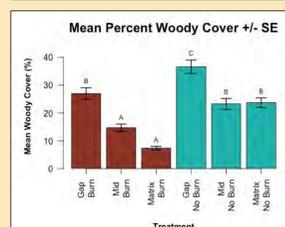
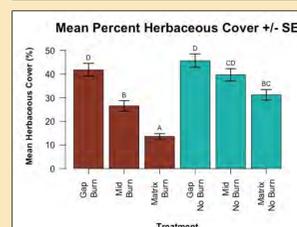
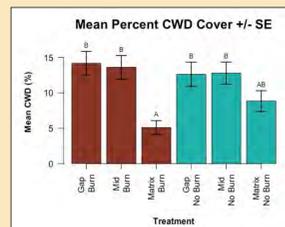
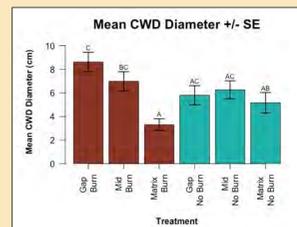
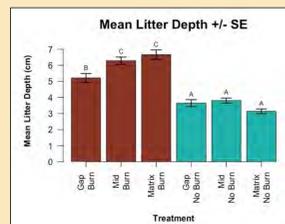
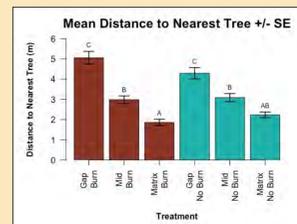
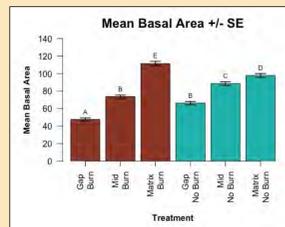
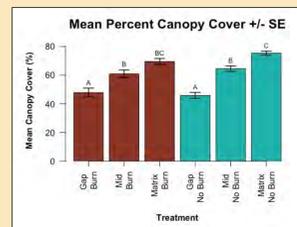
Treatment effect on acorn removal

- 20 – 25% overwinter removal
- Logistic regression to test acorn pilferage probability in different treatments
- No significant difference between burn and unburned treatments in regards to acorn pilferage probability



Cache microsite characteristics

- ANOVA to test microsite differences among treatments
- Microsite characteristics show significant differences between burn and unburned treatments



Discussion

- Low overwinter acorn removal
 - Reported removal much higher
 - 2 – 30% removal per day (approximately 100 – 80% removal over our time frame)¹
- Trend of higher removal in midstory reported in other studies
 - Southern Indiana²
 - May be due to ideal microsite characteristics, with high canopy and understory cover
- Microsite characteristics may be more important for pilferage probability than site-level treatments
 - Higher removal in areas with shrubs, CWD, and canopy cover^{3,4}



Future Work and Analyses

- Final check
 - Determine unpilfered to germination
 - Check for germination differences among sites
- Future analyses
 - Cox-Proportional Hazard Model to estimate influence of microsite characteristics on removal
 - Model selection procedures to determine the most important variables influencing pilferage



References

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