Plant community composition following low-intesity fire on Round Bald

J. Hillert

**Disclaimer** *This is not a full literature review. I still have >12 sources to read and annotize, before I am satisfied with the intro. However, it’s been too long and I NEEDED to put something down (I’m ignoring the fact that its verbose, conciseness can come later). Secondly, I wanted to make sure I got something in before the start of the semester, in order to get it review’d and editted by the middle (hopefully) of January. So long as I keep my ducks in a row, I plan to finish by AUGUST.*

## Abstract

## Introduction

### History, in brief

Upper montane treeless meadows - balds - host high floral diversity, panoramic views of the landscape, and origins shrouded in mystery (Murdock 1968, Gersmehl 1970, Hamel and Somers 1990). There has been much in the way of “bald history” in the literature, but there is relatively little regarding vegetation dynamics following disturbance. Management of these balds varies by agency, type of bald - heath or grass - and proposed history - whether it was cleared, grazed, burned, or some combination of these. Separating bald origins and subtype vegetation dynamics is key to preserving these dwindling ecosystems and to conserve them for future generations to enjoy. Here, our intention was to examine changes in the vegetation community following a low-intensity ground fire in February of 2022, that burned approximately 24 acres on Carver’s Gap. Fortunately, there was pre-burn data provided by Stokes and Horton (2022), they had examined the vegetation composition following 30 years of mowing management.

### Managment Practices

### Woody Encroahment

### Round Bald

## Methods

### Field - Season 1 (2022)

Round Bald is located in the Roan Mountain Massif of the Unaka Mountain range of the Southern Appalachian Mountains, between Carver’s gap and Engine gap. The Appalachian Trail (AT) bisects the study site into North of the trail and South of the trail. The site itself is spread across Pisgah National Forest in North Carolina and Cherokee National Forest in Tennessee, at approximately 36° 06’N and 82° 60’W. In this study we sampled transects reestablished by Stokes and Horton (2022). We measured the percent coverage of vegetation using a 1-m2 PVC quadrat divided into 100 equal sized squares. Each square was visually assigned by dominant vegetation type to equal 100% coverage per plot. Using the data collection tool from Stokes and Horton (2022) and USFS botanist Gary Kauffman, a total of 226 plots along 12 transects were sampled in 2020, of these, 52 plots along the first four transects were in the February 2022 fire and another 47 plots along the same transects were untouched by the fire. This provided an opportunity to examine the changes in plant community composition following low-intensity ground fire over two sampling seasons in June of 2022 and 2023.

### Greenhouse - Season 1

To examine the effects of the fire on the seed bank, seed bank samples were collected in July 2022. Approximately X grams of soil was obtained from the top 5 cm of soil at six random sites in one of four treatments; over 50% *Rubus*-in fire, over 50% *Rubus*-out fire, under 25% *Rubus*-in fire, under 25% *Rubus*-out fire. A total of 24 soil seed banks samples were taken, placed in tins, transferred to the greenhouse, and placed in 11x8.5 inch seedling trays filled with potting mix to 5 cm depth. An additional six trays only filled with potting mix will act as greenhouse controls to rule out contamination. Trays were randomly set in the greenhouse at ambient temperature and humidity and measured continuously with a Govee probe. As seedlings emerge they will be identified, recorded, and removed; while the species that cannot be identified will be repotted until identifiable following Price et al. (2010). Each month the trays were rotated in random order to rule out growth condition bias. In December of 2022, soil sample trays were placed outside to simulate winter conditions and potentially germinate seeds in the seed bank. A second soil sample following the same protocol will be conducted in March of 2023. These samples will examine what is readily germinable following natural winter weathering. These samples will be compared to the first set to examine post burn germinable seeds versus post winter germinable seeds.

### Statistical Analysis - Season 1

## Objectives & Expected results

# References

Gersmehl, P. 1970. A geographic approach to a vegetation problem: The case of the southern appalachian grass balds. Ph.D. Dissertation, University of Georgia, Athens, GA. 463 pp.

Hamel, P., and P. Somers. 1990. Vegetation analysis report: Roan mountain grassy balds. Challenge Cost Share Project.:25.

Murdock, N. A. 1968. Evaluation of management techniques on a southern appalachian bald. Unpublished M.S. Thesis. Western Carolina University. 62 pp.

Price, J. N., B. R. Wright, C. L. Gross, and W. R. D. B. Whalley. 2010. [Comparison of seedling emergence and seed extraction techniques for estimating the composition of soil seed banks](https://doi.org/10.1111/j.2041-210X.2010.00011.x). Methods in Ecology and Evolution 1:151–157.

Stokes, C., and J. L. Horton. 2022. [Effects of grassy bald management on plant community composition within the roan mountain massif](https://doi.org/10.2179/0008-7475.87.1.105). Castanea 87:105–120.