Disturbance Ecology of Arundinaria Appalachian

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Introduction

- Hill cane is a newly described species, recently separated from A. gigantea (Tripplett et al. 2006).
- The biology and ecology of hill cane is largely unknown.
- However, it is unknown whether fire and canopy reduction are also important to canebrakes of hill cane. This study will conduct field observations and apply treatments of fire and canopy reduction to several populations of A. appalachiana on the Domain of the University of the South to determine the biological and ecological response of hill cane to these disturbances. We hypothesize that A. appalachiana will increase culm density and re-sprout vigorously in response to fire and canopy reduction than isolated upland patches due to relative water and nutrient availability.

Methods

- This study contains 6 replicates of 8 plots for a total of 48 plots. Each plot receives a treatment of fire and canopy reduction (Figure 1).
- Plots were chosen based on similar culm densities within each location.
- Plots measure 1 meter in diameter.
- Nine culms were marked with metal tags in every compartment for tracking of response to disturbance.
- Plots were measured in the Spring of 2014 to establish a pre-experiment baseline. All surviving tagged culms will be re-measured in the fall of 2014 at the end of the growing season to determine hill cane’s response to fire and canopy disturbance in the first year.

Expected Results

Tripplett et al. 2006 hypothesize that hill cane is slow growing and can persist for decades or even centuries. If hill cane is always a slow growing clone, then one would expect little to no response to fire or canopy reduction in the first several growing seasons post-disturbance. If hill cane can be triggered by fire or canopy reduction to increase culm density and canelike vigor in the first growing season, then one could reasonably conclude that hill cane has a similar fire ecology as its congener A. gigantea. If hill cane is able to respond vigorously to disturbance, then this would suggest that hill cane is a disturbance adapted species able to take advantage of light gaps caused by tree blow down and or fire. Perhaps hill cane can persist in an area for long periods of time, ”waiting” for fire or light gaps to occur overhead. I expect that fire, canelike reduction, and the combination of the two will increase culm density and overall health of canebrakes of hill cane within one or two growing seasons. However, I expect that canebrakes with low culm density and small plants, as is the case for many upland patches, might not have enough energy reserves to respond vigorously, and might be killed by fire. This study will implement fires and canopy reduction to 48 small plots of hill cane, and is a necessary step to discovering more about this newly described species.

Conclusion

I will continue this project this summer, continuing this study, taking more measurements, and designing and conducting more experiments to learn more about the biology and ecology of hill cane. This study will serve as my honors thesis and capstone project for my Ecology and Biodiversity major. The goals of this study are to have this research published, and to potentially collaborate with experts in this field to conduct DNA analysis of this clonal bamboo.

References

Special thanks to Nate Wilson for his fire expertise and his assistance with burns and permitting.

For a full list of works cited please see attached bibliography