P3.3 COMMUNITY ANALYSIS OF FIRE MAINTAINED PITCHER PLANT BOGS IN THE LITTLE RIVER CANYON NATIONAL PRESERVE, ALABAMA, USA.

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Abstract

Pitcher plant bogs of the Little River Canyon in northern Alabama, USA contain the federally endangered green pitcher plant (*Sarracenia oreophila*). The bogs are located on exposed sites bordering the canyon rim. *Sarracenia oreophila* requires abundant sunlight and open conditions for survival. Fire suppression and infrequent prescribed burns has resulted in the development of a thick midstory and decline in *Sarracenia oreophila* populations. Analysis of the bog vegetation revealed two communities types with different species compositions, soil and landform characteristics and fire regimes.

Introduction

Federally endangered populations of *Sarracenia oreophila* are scattered throughout rocky bogs areas in northern Alabama and Georgia and western North Carolina (US Fish and Wildlife Service 1994). *Sarracenia oreophila* is a fire dependent carnivorous plant. Insects captured in the pitcher supplements the plants nutrients. *Sarracenia oreophila* populations occur on open sites where the water table is at or near the soil surface. Historically these sites were maintained in an open condition by fire. In the absence of fire a dense midstory forms preventing *Sarracenia oreophila* from receiving adequate sunlight.

The Little River Canyon National Preserve near Ft. Payne, AL has eight bogs with populations of *Sarracenia oreophila*. Some of the populations have been successfully burned. The objective of this study was to examine difference in bog structure and relate the differences to fire and soil and landform variables.

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Methods

The study area was the Little River Canyon National Preserve near Ft. Payne, AL. This unique area is located on top of Lookout Mountain in the Ridge and Valley region of northeast Alabama. The canyon has been cut into Lookout Mountain by Little River. Pitcher plant bogs are located near the rim of the canyon where the water table is at or near the soil surface.

In the summer of 2003, a plot was established in 7 of the 8 bogs. The bogs were free of recent disturbance with the exception of fire. Tree, sapling, and seedling strata were sampled in a 10 X 30 meter plot following the Carolina Vegetation Survey protocol (Peet et al. 1998). Soils samples were collected by horizon from four locations within the plot to determine soil horizon depth. Landform variables sampled included slope gradient, aspect, terrain shape index (TSI), and landform index (LFI).

Ecological land units were delineated through ordination and cluster analysis of presence/absence data. Species occurring in more than one strata were considered separate species. The ordination program employed were correspondence analysis, detrended correspondence analysis, canonical correspondence analysis, principal components analysis, and nonmetric multidimensional scaling (McCune and Grace 2002). The hierarchical cluster analysis was with TWINSPAN (Hill 1979) and PC-ORD using Jaccard, Euclidean, and Sorenson (Bray-Curtis) distance measures (McCune and Grace 2002).

Results

All pitcher plant bogs shared certain species in common including *Acer rubrum*, *Liquidambar styraciflua, Oxydendrum arboretum, Pinus taeda, and Quercus falcata*. Most of these species were sapling size (<5 cm dbh), although *O. arboretum, P. taeda,* and *Q. falcata* were tree sized. Two pitcher plant communities were identified at a landscape scale. Slope gradient and aspect were similar on all sites. A scarlet oak (*Quercus coccinea*), post oak (*Q. stellata*), flowering dogwood (*Cornus florida*) community was found on more exposed sites with a LFI of 10. A TSI of 3.5 indicated that these bogs were primarily convex in shape. The A and B horizon depths were 25.7 and 67.7 cm, respectively. Although this community was more exposed and should be more susceptible to fire, it had a thick midstory. The midstory included *Castanea pumila, Cornus florida, Quercus coccinea, Q. falcata, Q. stellata, Q. rubra, Q. alba, Q. velutina, Rhus copallina, Lyonia ligustrina, Aronia arbutifolia,* and *Carya tomentosa.*

A sweetgum (*Liquidambar styraciflua*), blackgum (*Nyssa sylvatica*), highbush blueberry (*Vaccinium corymbosum*) community was found on more protected site with a LFI of 11.9. The site was slightly less convex in site with a TSI of 2.8. These were deeper for the A and B horizon, 22.7 and 79.6 cm, respectively. This community was bisected by ephemeral streams. Although less exposed with deeper soils and the presence of ephemeral streams, this community had a more open midstory due to the low severity of prescribed fire. The midstory included *Vaccinium corymbosum, Rhododendron canescens, Viburnum dentatum,* and *Aronia arbutifolia.*

Conclusions

The scarlet oak-post oak-flowering dogwood community had a dense midstory preventing sunlight from reaching the forest floor. Prescribed fires are necessary for the survival and management of *Sarracenia oreophila*; however, they can permit the development of a dense midstory if not applied at the proper interval. Although the scarlet oak-post oak-flowering dogwood community inhabits more exposed habitats and should burn more often and severely, this is not the current situation. Fires have been severe enough to reduce the overstory, but not severe or often enough to prevent the development of a dense midstory. The sweetgum-blackgum-highbush blueberry community occupies moister more protected sites with evidence of prescribed burns. These burns have not reduced the overstory enough to permit the development of a dense midstory. Fires are likely to be less severe and at longer return intervals due to the presence of ephemeral streams. The application of more frequent fire is necessary in both communities to insure the survival of *Sarracenia oreophila*. More severe fires are needed in the scarlet oak-post oak-flowering dogwood community.

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