Introduction

- *Silene catesbaei*, commonly known as fringed campion, is a perennial herb from the Caryophyllaceae family (USDA Natural Resources Conservation Services, 2019).
- Found in several western and central counties in Georgia and in two Florida panhandle counties.
- Classified as endangered since 1991 with an imperiled status (NatureServe, 2019).
- Can grow up to 40 cm in length, with roots averaging around 25 cm.
- The leaves are spatulate-shaped and form a rosette pattern. Flowers are formed in clusters of 3 to 5, with 5 pink petals that are fringed at the ends.
- Reproduces asexually by having the stems fan out and root a new rosette apart from the parent plant. The stem then decays, leaving a genetically identical and separate progeny plant.
- Due to this, the genetic variability between plant samples in each area is very low (NatureServe, 2019).

Threats to *S. catesbaei*

- *S. catesbaei* is threatened by environmental factors, intrinsic traits, and human activity. The largest concern is the number of invasive species encroaching on *S. catesbaei* habitats. In Georgia, *Lonicera japonica*, *Ligustrum sinense*, and *Hedera helix* are the most problematic species.
- In addition to the environmental threats, it is difficult to artificially induce germination of *S. catesbaei* seeds, which makes propagation of the species quite challenging.
- A common problem within the *catesbaei* species is the shrinking gene pool as a result of low diversity, reduced population size, and asexual reproduction (Kephart, 2003).
- Lack of genetic diversity puts populations at a greater risk of extinction, as the plants would have less potential to survive unfavorable conditions, such as disease and climate change.
- Industrial logging and clearing of slopes are another threat to population numbers.
- Unfortunately, many of the discovered populations are located on private properties, making it difficult to protect this species.

Materials & Methods

Populations of *S. catesbaei* were established into two locations at the Ocmulgee Mounds National Historic Park in Macon-Bibb County. The plants were grown from samples collected at Tanyard Creek in Crawford County. Forty-two plants were placed in three locations. Plants from a Macon parent population were also established in late April of 2019 in a new location near Rosa Taylor Drive in Macon, GA. There were a total of 15 plants established at this site. There were five different elevations with three plants at each elevation. A third of the plants were placed in areas cleared of English Ivy to observe their resilience of habitat destruction via invasive species. Seasonal management of the English Ivy around the site is performed as needed. When planted, the number of rosettes and leaves were recorded to establish a base for tracking growth. Monthly observations were set in place to monitor growth and survival of this new population. These observations gather data on general plant health, rosette number, stalk number, and flower/seed capsule per plant.

Results

Figure 1 displays the average leaf and rosette count of the Ocmulgee Mounds site. It is important to note that the Ocmulgee site experienced flooding during February which made us unable to collect data from half of the site. The leaf and rosette count remained consistent among living plants during the colder months, but growth spikes occurred sooner than expected due to a warmer winter. *S. catesbaei* had a minimum leaf count during June as the plant was getting settled but increased over time and reached a maximum during February. Rosette counts experienced the same trend. Shown in Figure 2 are the averages for the leaf amount and rosette count for the Rosa Taylor site. At this site, the mean leaf count peaks in June, quickly decreases in fall, and reaches its minimum in November. Data from both sites included an omission of deceased plants. These plants were omitted to keep the data accurate due to the mortality rate from May to February being 66%, obscuring the positive correlation with time. Both sites had low initial sample sizes, but the overall growth trend at the Ocmulgee was upward (\(R^2 = 0.41\)), while the overall Rosa Taylor trend was downward (\(R^2 = 0.15\)).

When looking at both sites together, the most mortalities occurred in the month of November with 9 plants dying. January and October were tied with 7 plants dying. Overall *S. catesbaei* growth is highly variable even within the general location of one population. We observed that *S. catesbaei* also seems to have better growth and higher survivability on inclines as opposed to flat ground.

Discussion

We expected the winter months to show the least amount of growth which is not the case. This may have been due to this winter being warmer than the average. However, the coldest months did have the highest mortality. We hypothesize that planting the *S. catesbaei* as soon as the climate begins to shift towards higher temperatures will give the plants a longer time to establish themselves. This will increase the likelihood of the next generation of plants surviving the transition from Summer into Autumn.

Because *S. catesbaei* has a limited geographic range of population sites, those available within its established regions have a responsibility to act in cultivating it. *S. catesbaei*, along with any endangered species population, should be monitored and preserved in order to maintain the natural ecosystem.

Acknowledgements

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References


Figure 1. Ocmulgee Mounds mean leaf and rosette values. Bars show two standard errors of the mean. N=15 plants were recorded for each thousand plants, note the range recorded from the number of deaths.

Figure 2. Rosa Taylor mean leaf and rosette values. Bars show two standard errors of the mean. N=15 plants were recorded for each thousand plants, note the range recorded from the number of deaths.

Figure 3. Combined monthly mortality for both sites.