

5/7/2021

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NC Native Plant Society Tom and Bruce Shinn Grant Update

Brief Summary

In highly competitive environments, the order in which species arrive can have long-lasting effects on a community's composition. For example, size differences can lead to large advantages in acquiring light for species in grasslands. Early arrival might give an individual an advantage by allowing it to grow large earlier. The effects of early arrival are especially important to understand given the effects of climate change on the timing of species' life events. Spring emergence and flowering are both shifting to be earlier due to warming among other factors. If species shift the timing of those events at different rates, their relative arrival timing may change, as well. Relative arrival shifts could have implications for species' interactions and, potentially, their coexistence.

To explore the effects of shifts in species' timing in both relative and absolute terms, I am conducting a field experiment in an old field at Duke Forest. I am using a native warm season grass, *Andropogon virginicus* or "broomsedge," and a nonnative cool season grass, *Schedonorus arundinaceus* or "tall fescue," to understand how plant species interact and coexist in different arrival order conditions. I am manipulating the order in which each species arrives in a plot, either giving one species a two-week advantage or introducing them at the same time. I am repeating all of these arrival order combinations beginning in early April and again beginning in early May. This later season introduction is mimicking a climate change scenario, in which species are emerging into a warmer spring, to disentangle whether species' interactions change in a warmer context.

Progress Report

Thus far, I have installed three quarters of the experiment. Early and late arrivers for the early season treatment have been transplanted, as well as the early arrivers of the late season treatment. The last cohort of plants will be transplanted on 5/18. I am beginning weekly height measurements of individuals in each plot to measure growth rate over the course of the season. I am also tracking their growth stage – vegetative, bud, flower, seed – week-to-week as well. At the end of the season, I will collect aboveground biomass data along with leaf trait data. I plan to continue the experiment for a second year next field season, as both of my species are perennials.