013

Effects of Warming on Switchgrass Photosynthesis and Leaf Chlorophyll Content

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Abstract

As a model bioenergy crop, switchgrass has high productivity that has benefits to carbon sequestration. Switchgrass also has a very high tolerance to an array of environmental stressors, especially from climate change. The impacts of climate change, such as the increase in temperature on switchgrass photosynthesis, has not been well established. We conducted a warming experiment on switchgrass at the Tennessee State University Research and Education Center in Nashville, TN. Switchgrass was grown, in the field, under heaters that increased the ambient temperature 1-3.3˚C. The main objective of this study was to evaluate switchgrass leaf photosynthesis under constant heat stress. Photosynthesis and chlorophyll content measurements were taken during the growing season of 2021. Increased temperature seemed to have a variable effect of leaf photosynthesis. Photosynthetic response was reduced in higher temperature plots in comparison to the ambient temperature controls. The results from this study have important implications for switchgrass in near future climate conditions. Reduced biomass production is likely with higher temperatures. This project was supported by the NSF EiR projects.

Keywords: Switchgrass, photosynthesis, biomass, climate change.