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Buffering against Heat, Drought, and Fungus in White Clover: Does Cyanogenesis Play a Role?

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As sessile organisms, plants are particularly vulnerable to increased drought and heat caused by anthropogenic climate change. Thus, the ability to adapt or exhibit plasticity in a changing environment is particularly important. In this research, I studied the ability of a widespread plant, white clover (*Trifolium repens*), to withstand heat/drought stress and fungal pathogens, and I further asked how these stressors might interact with a well-studied chemical defense trait (cyanogenesis). White clover is polymorphic for cyanogenesis (the production of hydrogen cyanide upon tissue damage), with both cyanogenic and acyanogenic individuals present in populations. Cyanogenesis is considered locally adaptive due to the repeated evolution of cyanogenesis clines, where higher proportions of cyanogenic plants are found in warmer and drier climates. Leveraging an F2 population of white clover plants currently growing at Tyson Research Center, I conducted an observational study during a natural period of heat and drought from late June through early August 2017. Plant height and green surface area were measured at three time points throughout the drought period, and fungal presence/absence and degree of infection were quantified. Here I present preliminary observations from one of the three replicate plots under study; analyses are ongoing. Future work may include genetic mapping to identify genetic regions that contribute to the variation we find in these traits.