**Soil Moisture and Nutrient Manipulations in a Temperate Mesic Old-Field Meadow: Which Exerts the Stronger Decadal Length Influence on Plant Community Structure and Production?**

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Soil nutrient and water availability determine plant community structure and productivity. Summer droughts will intensify soil water stress in temperate mesic grasslands, but water manipulation studies remain uncommon, and rarely consider nutrient interactions. Moreover, grassland recovery from long-term drought is an understudied metric of community resilience. My study tests the hypotheses that: 1) enhanced water and nutrient availabilities together will increase plant production only during a relatively dry summer; and 2) Plant community structure as a result of a long-term imposed drought will remain significantly altered, even after returning to ambient rainfall. Aboveground biomass was harvested to determine species richness and abundances from an Ontario grassland experiment set up in 2010, which applied factorial water (rain-out shelters, control, or water addition) and nutrient (control or NPK fertilizer addition) treatments to 1m2 plots (n=10). Drought recovery will be determined by assessing diversity in plots that were returned to ambient rainfall since a 2016 harvest. My preliminary results suggest that plant productivity is mainly dependent on soil nutrient availability, but that drought diminishes this effect by reducing plants’ access to nutrients. Investigating the interactive effects of nutrient and water availability in grasslands is relevant for both agricultural applications and fundamental ecological science.