INTRODUCTION
- Nitrogen (N) addition generally decreases plant diversity.
- Herbivore activity generally intervenes with these effects by maintaining diversity.
- Herbivores accomplish this by relieving the competition for ground-level light and nutrients.
- Little is known if temporal variation in N addition changes these effects.

RESEARCH QUESTIONS
1. What are the effects of adding nitrogen at different temporal scales?
2. Does herbivory alter these effects?

HYPOTHESIS AND PREDICTIONS
- H1: An intense, quick addition of N reduces diversity more than small, consistent additions spread out over time due to the prolonged exposure.
- P1: Quick N levels will cause species diversity to decline faster in the absence of herbivory.
- H2: Herbivore activity reduces the differences by limiting growth.
- P2: Herbivory will increase species diversity by the same amount for both N treatments.

METHODS
- Planted 6 tallgrass prairie species (Table 1) at near constant densities after controlling for live seed percentage.
- Applied the same amount of N to all pots but when they received N differed (n=50 pots/treatment).
- Fast N treatment received entire amount (1.6mL N + 98.4mL H2O) in beginning, then received an additional 100mL of H2O weekly to match with Slow treatment.
- Slow N treatment received partial amounts (0.4mL N + 99.6 mL H2O) weekly for 4 weeks.
- 25 pots in each N treatment received simulated herbivory.
- Simulated herbivory consisted of cutting plants at the soil surface.
- Percent coverage was measured before and after N treatments.
- Final biomass was collected at the end.
- ANOVA done through RStudio (1.0.136).

RESULTS
- Figure 1. Fast N treatment with no herbivory had greater evenness compared to Fast N treatment with herbivory (p<0.05).
- Figure 2. Fast N treatment with no herbivory had greater species diversity compared to Fast N treatment with herbivory (p<0.05).

REFERENCES

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FUTURE RESEARCH
- Use same species.
- Add additional species from each functional group to mimic natural conditionals.
- Simulate large grazing herbivory.
- Change the temporal patterns to biannual and monthly.

METHODS (cont.)

Table 1. Common and scientific name of all tallgrass prairie plant species used, arranged by functional group.

<table>
<thead>
<tr>
<th>Tallgrass Prairie Plant Species Used</th>
<th>Legumes</th>
<th>Forbs</th>
<th>Grasses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partridge Pea (Chamaecrista fasciculata)</td>
<td>Health Aster (Aster ericoides)</td>
<td>Indian Grass (Sorghastrum nutans)</td>
<td></td>
</tr>
<tr>
<td>Showy Tick (Desmodium canadense)</td>
<td>Grayheaded Coneflower (Rathbunia pinata)</td>
<td>Virginia Wildrye (Elymus virginicus)</td>
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</tr>
</tbody>
</table>

CONCLUSIONS
- There was a significant difference between herbivory and no herbivory.
- There was no significant differences between N treatments.
- Data showed opposite effects of original predictions.
- Time appears to be an important factor.
- Shorter term studies might have weak or negative herbivory effects because of relatively few disturbances to the soil (which is what was found in our study).
- Also depends on the environmental characteristics and size of the herbivore species.
- Limitations would include uncontrollable factors such as environmental temperature and watering amount between soil pots.