Effects of Grazing on Arthropod Presence and Diversity in Grazing Experiment at Timberlake Biological Field Station

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INTRODUCTION

- Grazing can have a varying effect on the growth of many native species of forbs and grasses.
- Plants native to grasslands are hosts to many organisms like arthropods.
- Any shift in the species composition of grasslands could potentially change the diversity of arthropods.
- There is still very limited information on the effects of grazing levels on arthropod diversity and abundance.

OBJECTIVES

- To make a comparative analysis between different grazing treatments and their effect on arthropod abundance and diversity.

Figure 1: Grazing experiment at Timberlake Biological Field Station

METHODOLOGY

- The grazing experiment is located in the Timberlake Biological Field Station in Texas; which is also a working cattle ranch
- Pitfall traps were filled with soapy water and arthropods were later preserved in 70% ethyl alcohol.
- Identification was made using various field guides [1,2]

Figure 2: Aspect of the grazing treatments (A) Grazed, (B) Partially grazed and (C) Ungrazed

METHODOLOGY (Cont.)

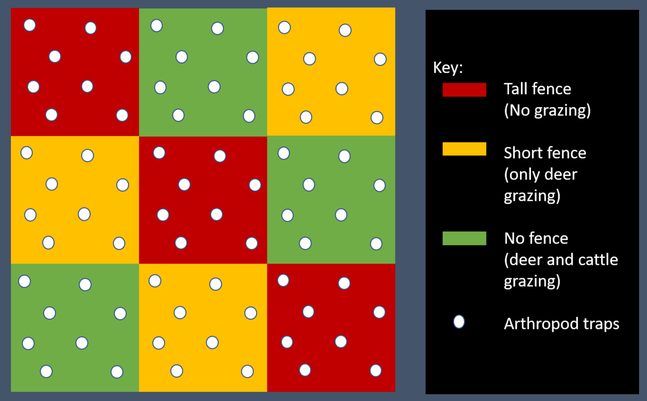

Figure 3: Experimental design for arthropod traps in the grazing experiment.

RESULTS

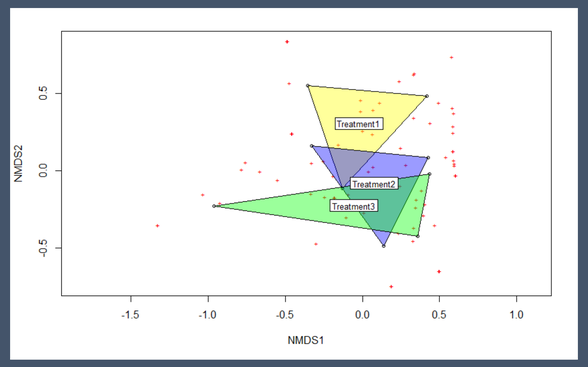

Figure 4: Non-metric multidimensional scaling for treatment; Treatment 1 is grazed; Treatment 2 is partially grazed; Treatment 3 is ungrazed.

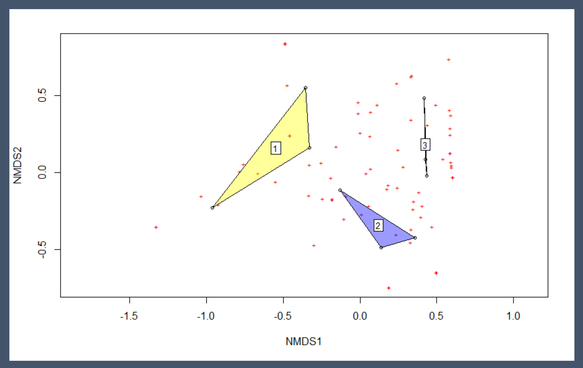

Figure 5: non-metric multidimensional scaling for time; 1 is 16-17/Jun; 2 is 28-29/Jun; 3 is 12-13/Jul; all in 2019.

Table 1: Arthropod diversity for grazed (GR), partially grazed (PG) and ungrazed (UG).

NAME OF SAMPLE	RICHNESS	SHANNON INDEX
GR1	33	19.955
GR2	36	18.555
GR3	29	14.646
PG1	37	28.560
PG2	27	10.027
PG3	38	22.749
UG1	17	9.430
UG2	32	16.281
UG3	36	18.503

RESULTS (Cont.)

Table 2: Most commonly observed arthropods throughout our study; *grazed (GR), partially grazed (PG) and ungrazed (UG).*

Site/Species	Common Name	GR	PG	UG	Total
Solenopsis invicta	Red Imported Fire Ant	29	59	76	164
Juvenile spiders	N/A	3	98	30	131
Pseudatomoscelis seriatus	Cotton fleahopper	76	16	18	110
Agelenopsis pennsylvanica	Grass Spider	26	24	36	86
Gyponana spp.	Planthopper	29	15	36	80
Gryllodes sigillatus	Indian House Criket	0	41	29	70
Diuraphis noxia	Russian Weat Aphid	29	7	19	55
Stegobium paniceum	Drugstore beetle	39	6	9	54
Gryllus sp.	Field Cricket	5	21	21	47
Myrmecocystus sp.	Honey Ant	7	13	24	44
Culicoides spp.	Punkies	18	18	6	42
Osmia sp.	Mason Bee	29	6	4	39
Pardosa delicatula	Thin-legged Wolf Spider	7	9	21	37
Andrena sp.	Burrowing Bee	28	4	2	34
Frankliniella occidentalis	Western Flower Trip	18	9	7	34
Anotia spp.	Derbid Planthopper	21	2	7	30
Misumenops asperatus	Northern Crab Spider	3	15	6	24
Corythuca cydoniae	Hawthorn lace bug	17	2	1	20
Sphecodes spp.	Cuckoo Bee	12	5	3	20
Tribolium confusum	Confused Flour Beetle	11	2	5	18
Mycetophila spp.	Fungus Gnats	10	7	0	17
Augochloropsis metalica	Metallic Green Bee	12	0	1	13
Cheiracanthium mildei	Long-legged Sac Spider	0	5	8	13
Linepethema hunile	Argentine Ant	1	10	1	12
Necrobia rufipes	Red-Legged Ham Beettle	10	2	0	12
Megachile sp.	Leafcutting Bee	8	2	1	11
Oxyopes salticus	Striped lynx Spider	0	4	7	11
Trombicula alfreddugesi	Chigger	1	9	1	11

CONCLUSIONS

- Grazed and ungrazed treatments showed little to no overlap in community composition, hence almost no similarities.
- Partially grazed showed overlap with both GR and UG demonstrating similarities in community composition.
- There was no overlap through time, indicating the possibility of seasonal communities.

REFERENCES

[1] Evans, A. V. (2007). *National Wildlife Federation Field Guide to Insects and Spiders & Related Species of North America* (illustrated, reprint ed.). New York, NY: Sterling Pub.

[2] Eaton, E. R., & Kaufman, K. (2007). *Kaufman Field Guide to Insects of North America* (illustrated ed.). Boston, MA: Houghton Mifflin Harcourt.

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