

Assessing Plant-Pollinator Community Composition within Riley County, Kansas: A Cool-Season Study

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Background

Pollinators (primary and secondary) provide a huge economic service to the agriculture producers of Kansas and the United States. The United State Department of Agriculture Annual Strategic Pollinator Priorities Report from 2022 states that pollinators add tens of billions of dollars to the US agriculture products for our diverse diet. Gathering information on pollinator communities is vital to improving our understanding of ecological effects on pollinators, and for managing our land to support the health of these populations and our environment.

We assessed the ecological health of environments with varying land usage by recording pollinator abundance and diversity at the start of the growing season in the Flint Hills of Kansas. This region is a producer of mainly wind-pollinated crops; however, there are those, like alfalfa and sunflowers, that prosper with pollinator facilitation. This study occurred over four different locations, each with a different land cover and land use. Treatment sites represented land cover and use variance in the Flint Hills. The four locations were categorized as: agriculture, tallgrass prairie, urban, and agroforestry. Therefore, our brief study recorded a limited assessment of active invertebrate and pollinator abundance and diversity during the early growing season.

Objectives:

- Effects of cool season on emergence of invertebrates,
- Diversity and abundance of pollinators (i.e., bees, butterflies, and moths)
- Differences in biodiversity of invertebrates among land cover types

Methods

Data Collection

- 2-week period, 3 sampling rounds
- 3 transects, 100 m length per treatment site
- Vegetation surveys from step-point observations
- Visual Obstruction Reading (VOR) from Robel pole every 4 m
- Invertebrate netting continuously along transect lengths
- Samples per treatment combined, sorted and grouped
- Recorded invertebrate abundance, richness, and diversity

Results

Tallgrass Prairie Treatment



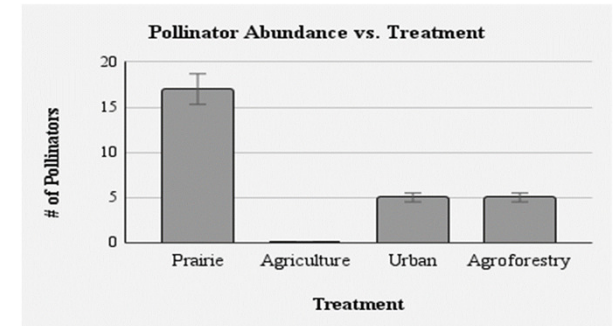
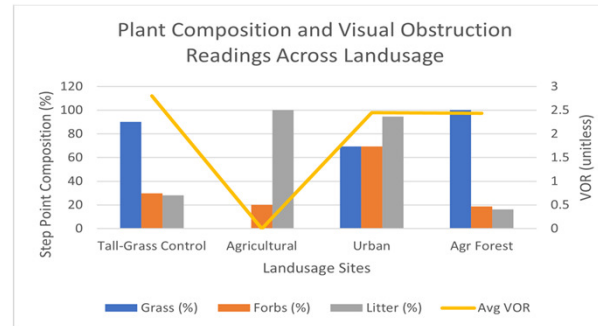
Urban Treatment



Agricultural Treatment



Agroforestry Treatment



Invertebrates of Different Land Usage			
Treatment	Abundance	Richness	Shannon Diversity Index
Tallgrass Prairie	48	4	1.20
Agricultural	0	0	0.00
Urban	30	6	1.74
Ag/Forest	294	7	1.38

We collected 346 individual invertebrates including a total of 23 individual pollinators in seven groups and found:

- Agriculture treatment had zero biodiversity for plants and invertebrates
- Urban cover type had the largest diversity index
- Agroforestry had the greatest invertebrate abundance, three times the abundance of any other sample area
- The tallgrass prairie had the most pollinators

Discussion

Factors impacting the invertebrate results include but are not limited to forb and grass density for nesting, habitat disturbances like herbicide treatment, intermittent freezing temperatures reducing active invertebrates, the short period of field work, experience in catching invertebrates, and more. The relatively scarce research on Kansas pollinators brought challenges in establishing local references and in comparing results of this study to prior works.

Closing Statements

Conclusion

Our sample areas reflected the invertebrate abundance in the Flint Hills in the early spring across various land usages. Our findings are in line with the literature and the background that pollinators and biodiversity are closely related. While we cannot make strong inferences on the current state of Flint Hill pollinators, we hope this study will add to the body of work and help guide future research.