

T The Relationship Between Prairie Dog
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The Relationship Between Prairie Dog Towns and Avian Communities

Andrew Hunter

Abstract

Black-Tailed Prairie Dog (Cynomys ludovicianus) once occupied extensive areas throughout the great plains. Due to massive control programs their populations have declined drastically. A new understanding of the importance of prairie dogs in a prairie ecosystem is needed. The relationship between prairie dog towns and avian communities was studied in Boulder Colorado, in 1996. It was found that prairie dog towns benefit avian communities. There was higher avian species richness and diversity associated with prairie dog towns than with sites never occupied by prairie dogs. This was attributed to the increased heterogeneity of species composition in prairie dog towns.

Introduction

Quantified information regarding vertebrate wildlife species living in or closely associated with Black-Tailed Prairie Dog (*Cynomys ludovicianus*) towns is lacking or is only alluded to in scientific literature (Sharps et al. 1990). Prairie dogs are gregarious creatures, occupying dry upland prairies in the western United States. Prairie dog's borrowing and foraging activities alter the soil and vegetation in and around their towns. They provide habitat diversity in the prairie ecosystem by mixing soils and regulating vegetative species diversity. Soils in prairie dog towns are richer in nitrogen, phosphorus and organic matter than soils in adjacent grasslands. Prairie dog towns provide habitat for many seed-eating and insectivorous creatures, by creating a biological niche or habitat for many species of wildlife (Sharp et al. 1990).

This study asks the question; how does the presence of prairie dog towns effect avian communities in that area? Prairie dog towns can have three possible effects on avian communities. They can have a negative effect, resulting in fewer birds being found in occupied prairie dog towns compared to abandoned or never occupied sites. They can have a positive effect, in which case a greater number of birds will be found in occupied sites. Finally, prairie dog towns can have no effect on avian communities. While the total number of birds may remain the same, the diversity of those birds may change between occupied, abandoned and never occupied sites. I predict that prairie dog towns will have a positive effect on avian communities, with higher species richness and increased diversity in that area.

Methods

On April 22, 1996, I began taking point counts for avian species in sites of each of the following categories; occupied prairie dog towns, abandoned prairie dog towns and sites never occupied by prairie dogs. All of the abandoned sites have been unoccupied since 1994. The succession in the area was similar in each of the abandoned sites. I visited five sites, one time for each of the three categories. Using 8 by 40 binoculars and knowledge of local bird songs, I recorded each bird within a fifty meter radius of the center of each site. I visited the fifteen sites, on days with similar temperatures and weather, between April 22nd and April 28th. All of the point counts were taken between 7:00am and 10:00am. All of the sites were within Boulder County's open space, in areas with as little human disturbance as possible.

Results

Seven different avian species were observed in the study. The Two most abundant species were the Western Meadowlark (*Sturnella neglecta*), with a total of 35 sightings, and the Vesper Sparrow (*Pooecetes gramineus*), with a total of 27 sightings. The American Robin (*Turdus migratorius*), European Starling (*Sturnus vulgaris*), Common Grackle (*Quiscalus quiscula*), Killdeer (*Charadrius vociferus*) and Northern Harrier (*Circus cyaneus*) were also recorded. The data from the five point counts in each category were totaled and recorded into table 1. The total number of birds observed in each of the three categories, occupied, abandoned and never occupied, were 22, 30 and 24 respectively. Species richness was 6 for occupied, 4 for abandoned and 3 for never occupied sites. The shanon-weiner index was used to measure the diversity of each category. It was found that occupied sites had a diversity of .521, abandoned sites had a diversity of .504, and never occupied sites had a diversity of .424. A chi-squared test was used to determine if there is a significant difference between the three category types, with respect to the western meadowlark and the vesper sparrow. The assumptions of the chi-squared test were not met by the american robin, european starling , common grackle, killdeer and the northern harrier. It was found there is a significant difference between the three categories, with respect to the western meadowlark and vesper sparrow ($p < .05$).

Table 1.

	occupied	abandoned	never occupied
W. Meadowlark	14	9	12
V. Sparrow	3	15	9
Am. Robin	1	4	0
Starling	2	2	0
Grackle	0	0	3
Killdeer	1	0	0
N. Harrier	1	0	0

Species richness	6	4	3
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Diversity	.521	.504	.424
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Chi-Square: 11.858 DF: 2 P<0.05

Discussion

The results of my study support my original hypothesis that prairie dog towns will benefit avian communities with higher species richness and increased diversity. Species richness was highest for occupied sites and lowest for never occupied sites. This implies that a greater number of species are able to take

advantage of the increased heterogeneity in plant cover and species composition of the prairie dog towns. The species diversity was also highest in occupied sites and lowest in never occupied sites. It can be assumed from these results that the benefits of prairie dog towns, toward avian species, decrease as succession in the area occurs. My conclusions of high species richness in occupied prairie dog towns is supported by the findings of Whitney et al. and Clark et al. Whitney recorded, of the 33 bird species observed in the grasslands of South Dakota, only 5 (15%) were not observed on prairie dog towns (Whitney et al. 1978). Clark recorded more species were associated with larger prairie dog town than smaller towns (Clark et al. 1982). Agnew et al. found that bird species diversity was higher in prairie dog towns (Agnew et al. 1986). They attributed their findings to the heterogeneous vegetation and species composition found in prairie dog towns.

There are many other factors that may have played a role in the results of my study. It is possible that the surrounding habitats associated with prairie dog towns are responsible for attracting diversity. An interesting follow-up study would be to compare different micro habitats in the prairie ecosystem. Is it the proximity to water or the distance from human development that truly regulate diversity in avian communities? Are areas similar to prairie dog towns, with heterogeneous species composition, also attractants of avian species? Studies similar to this one are important when trying to understand what is needed to create a healthy ecosystem, with high species richness and diversity.

References

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