Herpetological and coleopteran communities of black- tailed prairie dog colonies and non-colonized areas in southwest Kansas

by

Justin E. Kretzer

B.S., Kansas State University, 1995
M.S., Kansas State University, 1999

ABSTRACT

I. Effects of black-tailed prairie dogs on reptile and amphibian community composition in shortgrass prairie habitats of Kansas Species diversity and abundance of reptiles and amphibians were measured on and off black-tailed prairie dog (*Cynomys ludovicianus*) colonies to determine the extent to which herpetological species composition in a shortgrass prairie ecosystem is affected by the presence of black-tailed prairie dog colonies. Ten species of reptiles and three species of amphibians were captured. Total amphibian and reptile abundance did not differ between prairie dog colonies and non-colonized shortgrass prairie sites, but species composition did. Reptile and amphibian mean species richness, evenness, and diversity were not different between treatments. However, the diversity of both treatments combined was considerably higher than the diversity on shortgrass prairie without prairie dogs. The mosaic pattern of prairie dog colonies on non-colonized prairie enhances landscape heterogeneity and contributes to greater reptile and amphibian diversity patterns in the shortgrass prairie biome of western Kansas than would occur without prairie dogs.

II. Effects of black-tailed prairie dogs on beetle community composition in shortgrass prairie habitats of Kansas Numerical abundance and diversity of surface-dwelling beetles were measured on and off black-tailed prairie dog (*Cynomys ludovicianus*) colonies to determine the extent to which families and species of Coleoptera area affected by the presence of black-tailed prairie dog colonies in a shortgrass prairie ecosystem. Relative abundance of beetles on and off prairie dog colonies were highly variable throughout 1996 and 1997. The total number of beetles captured, and relative abundance of the five 'major' families, were general greater on prairie dog colonies. Relative abundance of the remaining 'minor' families were similar between treatments.

Each beetle family was categorized as a herbivore, decomposer, or predator. Differences in relative abundance of each trophic group were compared between treatments. We also examined the relative abundance of the five 'major' families independently to determine whether individual family response was consistent with the response of the entire trophic class. Although, all three feeding groups showed a positive response to prairie dog colonies, the phytophagous beetles were more sensitive to prairie dog activities than the other groups. Inconsistent responses among individual families within each feeding category were detected. Within the herbivore group, more Chrysomelidae were captured on prairie

dog colonies in 1996 and 1997. In contrast, the number of Elateridae captured on prairie dog towns was greater during 1996, but not 1997; while in both years the number of phytophagous Scarabaeidae captured on prairie dog colonies was similar to non- colonized sites. Within the decomposer group, Tenebrionidae showed patterns that differed greatly depending on collection period. In contrast, relative abundance of Scarabaeidae categorized as decomposers showed the same positive response to prairie dog colonies as the Chrysomelidae. Carabidae was the most abundant predatory family, and was largely responsible for greater numbers of predatory beetles sampled on prairie dog colonies.

Richness, evenness, and diversity of Coleoptera families and of species belonging to the Carabidae and Scarabaeidae families were also compared between areas with and without prairie dogs. The most abundant beetle families and most abundant Scarabaeidae and Carabidae species responded positively to prairie dog colonies, resulting in high dominance on prairie dog colonies which reduced Shannon diversity values. Taxonomic richness on shortgrass prairie was enhanced by sampling a combination of areas with and without prairie dogs.