

Coccidia Presence in Prairie Dog Communities

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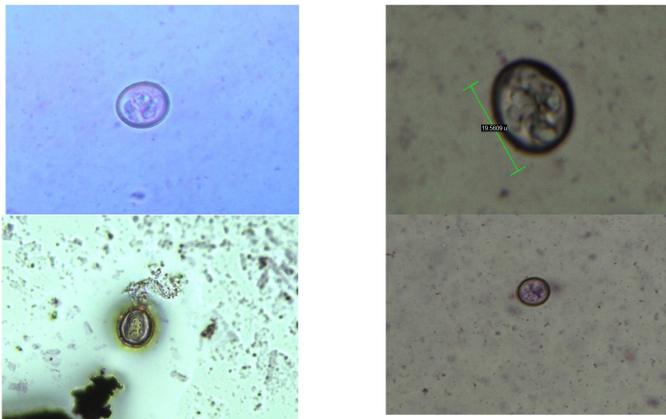
Cody, WY

Abstract

Coccidia, members of the Phylum Apicomplexa, comprise a taxonomically diverse and cosmopolitan group of potentially pathogenic protists infecting a wide range of vertebrate and invertebrate hosts. Since 2013, we have been investigating the prevalence, diversity, and distribution of coccidia in passerines in the Big Horn Basin. Recently, we have begun investigations into these parameters across mammal species by relying upon passive collection of fecal materials; in this case, black-tailed and white-tailed prairie dogs (*Cynomys ludovicianus* and *C. leucurus*, respectively). We collected fecal samples from two black-tailed prairie dog towns in Butte County, SD, and two white-tailed prairie dog towns in Park County, WY to determine if coccidian parasites could have an effect on their population status (increasing or decreasing). Preliminary analyses indicated that one black-tailed prairie dog colony was increasing in size (54.4 hectares) while the other was decreasing (33.4 hectares). Furthermore, we showed the decreasing colony tended to exhibit higher numbers of *Eimeria* sp. oocysts/g fecal material than did the increasing colony ($\bar{x} = 682.40 \pm 235.63$, $\bar{x} = 388.92 \pm 128.48$, means \pm SE, respectively; $t = 1.444$, $df = 21$, $P = 0.163$). The white-tailed prairie dog colonies have no associated preliminary information.

Introduction

Coccidia have been studied in many mammals and birds. Prairie dogs were studied in the early 1960's and only three types of *Eimeria* were found; *E. ludovicianim*, *E. cynomysis*, *E. larimerensis* all found in white-tailed prairie dogs by Vetterling (1964). Another study was done on Wyoming white-tailed prairie dogs in 1989 and no coccidia were found (Seville and Williams, 1989). This an area lacking research and in need of attention.



Methods

All samples were collected by Eric C. Atkinson from South Dakota and Alison Winkler from Cody, Wyoming. We then air dried the samples in uncapped 15 ml centrifuge tubes, weighed each to 0.0001 grams, incubated for 7-10 days in 2.5% potassium dichromate, and floated for 30 min in 1.28 sp gr sucrose solution adding one drop Schiff's reagent. Slides of the samples were made and viewed at 200x and 400x, counting the sporulated and unsporulated oocysts/g fecal material. We identified observed coccidia to genus.

Results

South Dakota (<i>C. ludovicianus</i>)	Sporulated Oocysts	Unsporulated Oocysts
Town 1	6/10 fecal pellets (60%)	8/10 fecal pellets (80%)
Town 2	9/13 (69%)	11/13 (85%)
Wyoming (<i>C. leucurus</i>)	Sporulated Oocysts	Unsporulated Oocysts
Town 1	0/4 fecal pellets (0%)	1/4 fecal pellets (25%)
Town 2	2/2 fecal pellets (100%)	0/2 (0%)

As shown in the above table, each prairie dog town exhibited coccidia. In our South Dakota black-tailed prairie dog samples there tended to be greater numbers of *Eimeria* sp. oocysts in the colony decreasing in size than in samples from the expanding colony ($t = 1.444$, $df = 21$, $p = 0.163$). Our Wyoming samples yielded a larger amount of coccidia present in one town versus the second, as well, but demographic information on these colonies was limited. The results of a Fisher's Exact Test indicated that there was minimal ($P = 0.326$) difference in prevalence (but not abundance) of coccidia in the black-tailed prairie dog colonies compared to those of white-tailed prairie dogs. The average number of coccidia oocysts found in the black-tailed prairie dog samples averaged 388-682 oocysts per sample. The white-tailed prairie dogs presented considerably less oocysts per slide containing at most 21 coccidian oocysts.

Discussion

It is possible that coccidia may be contributing to the decline of one South Dakota prairie dog colony, but more research would certainly be warranted to make this conclusion. Cody, Wyoming samples were collected from two separate prairie dog towns right out of hibernation. Town 2 was full of *Eimeria* oocysts (specific species unknown) and had many prairie dogs that looked heavier than Town 1 that contained no coccidia. For future studies an area of focus would be the health/weight of the prairie dogs or if the coccidia presence has any demographic effect. The amount of coccidia found per fecal sample could play a part in how the prairie dogs are affected. A fecal sample with 21 oocysts may cause more problems than a sample with one oocyst. In this study, it is important to note that there is not a difference between the pattern of coccidia in white-tailed versus black-tailed prairie dogs. However, this system provides a great avenue for future research.



Acknowledgements

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Literature Cited

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