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Sarcocystis IN FREE-RANGING HERBIVORES ON THE NATIONAL BISON RANGE

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Abstract: Heart, esophagus, diaphragm and skeletal muscle tissue obtained from various herbivores on the National Bison Range were examined grossly for *Sarcocystis*. *Sarcocystis* was found in 81, 50, 50, and 13% of the mule deer, *(Odocoileus hemionus)*, white-tailed deer *(O. virginianus)*, elk *(Cervus elaphus)*, and bison *(Bison bison)*, respectively.

INTRODUCTION

Sarcocystis is known to be capable of causing disease in livestock such as cattle, swine and sheep.[1,6] *Sarcocystis* also has been reported in mule deer *(Odocoileus hemionus)* [3,6,7] white-tailed deer *(O. virginianus)*,[4] and elk *(Cervus elaphus)*,[5,6,7] but the impact of such infections in these and other wild herbivores is not well understood.

In the western states, various species of wild and domestic herbivores share rangeland. To determine the prevalence of *Sarcocystis* in animals sharing a common range, a study of *Sarcocystis* infections in various species of wild herbivores was conducted on the National Bison Range near Missoula, Montana. Prevalence of *Sarcocystis* in mule deer, white-tailed deer, elk and bison *(Bison bison)*, all of which share this range, are reported herein.

MATERIALS AND METHODS

Mule deer, white-tailed deer, elk and bison occupying the National Bison Range (NBR) were examined grossly for *Sarcocystis*. Herbivores were obtained during the annual herd reduction or during the course of other research from November, 1976 to October, 1977. Deer and elk were examined in the field, while bison were examined at a local slaughterhouse. Skeletal muscle, esophagus, diaphragm and heart from each animal were examined grossly for *Sarcocystis*.

Sarcocysts and some surrounding host tissue were excised from infected organs of some animals, fixed in 10% formalin, processed routinely, sectioned at 10 μm and stained with hematoxylin and eosin. Other specimens were fixed in 3% (v/v) gluteraldehyde in 0.2 M cacodylate buffer (pH 7.2), embedded in Spurr's or Epon 812 medium, sectioned at 1 μm and stained with Paragaon polychrome stain.

RESULTS AND DISCUSSION

Upon gross examination, 57 of 72 (81%) mule deer, 12 of 24 (50%) white-tailed deer and 12 of 24 (50%) elk were infected with *Sarcocystis* (Table 1). In deer and elk, sarcocysts were observed in approximately equal numbers in the esophagus, heart and diaphragm, whereas cysts were found only in the hearts of 2 of 15 bison (Table 1). About 20% of the deer with cysts in the other tissues also had cysts in the skeletal muscles. Sarcocysts in all infected animals appeared white and ellipsoidal in shape; however, a few cysts in the diaphragms from mule deer were spheroidal in shape. In most animals, sarcocysts ranged in size from approximately 0.2 mm × 0.4 mm to 0.4 mm × 1 mm, although some were as long as 5 mm in the skeletal muscle of deer.

TABLE 1. *Sarcocystis* in wild herbivores on the National Bison Range as determined by gross examination.

	Animals Examined	Animals Infected(%)	Organs Infected[1]			
			Heart	Diaphragm	Esophagus	Skeletal Muscle
Mule Deer	72	57(81)	15	17	25	16
White-Tailed Deer	24	12(50)	4	7	1	10
Elk	24	12(50)	4	4	4	0
Bison	15	2(13)	2	0	0	0

[1]Number of animals with 1 or more sarcocysts

Examination of sarcocysts by light microscopy revealed a similar structure among sarcocysts in deer, elk and bison. The cyst was bound by a prominent wall. Septae traversed the cyst separating it into compartments, each of which contained bradyzoites and metrocytes.

In a study in California, Sayama[6] found that 68% and 55% of yearling and adult mule deer and elk, respectively, had microscopic cysts of *Sarcocystis*. Prevalence of infection recorded here probably is low since only a few tissues from only certain animals were examined microscopically for the presence of *Sarcocystis*. The prevalence of infection found by gross examination in the present study is similar to a report of macroscopic cysts in cattle[7] but is lower than that reported for microscopic cysts in white-tailed deer.[4]

Hudkins and Kistner[2] found that 9 of 11 mule deer fawns died after inoculation of *Sarcocystis hemionilatrantis* sporocysts.[2] They suggested that infection with *Sarcocystis* might be partially responsible for declining mule deer populations in Oregon. During the past several years, the number of deer fawns produced on the NBR has progressively declined (Brown 1978, pers. comm.). Although the reasons for this are unclear, the presence of relatively large numbers of macroscopic cysts in these animals, which is an indication of heavy infections,[6] suggests that *Sarcocystis* may be partially responsible.

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