

GIARDIA AND OTHER PARASITES OF
SMALL MAMMALS IN
GRAND TETON NATIONAL PARK

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Objectives

The objectives of this study are to document the effects of parasitism on vole (Microtus spp.) population dynamics and to determine the potential of small mammals in Grand Teton National Park to serve as reservoirs of human parasites.

Immediate goals for 1989 were to (1) continue the documentation of the incidence and prevalence of small mammal parasites, (2) determine the age at which Giardia infections are contracted by the Microtus host, (3) identify ticks associated with small mammals, and (4) survey small mammals for Babesia infections.

Methods

Voles, primarily Microtus montanus, were live-trapped on six study sites used by Dr. A. J. Pinter in Grand Teton National Park at an approximate elevation of 2057 meters. A variety of small mammals were trapped including jumping mice (Napaeozapus spp.), shrews (Sorex spp.), and pocket gophers (Geomys spp.), although these species were captured in much smaller numbers than Microtus. Analyses for the presence of parasites were done on all small mammals captured.

To confirm the presence of viable trophozoites of Giardia, wet mount preparations were made from scrapings of the duodenal mucosa. Thin blood smears, and liver, spleen and bone marrow impression smears were stained with Wright's Giemsa and

evaluated for Babesia infections and for erythrophagocytosis. Reticulocyte counts, hematocrits, and white blood cell counts were also performed on blood samples. Spleens were removed, weighed and measured.

Portions of intestine taken from voles and shrews, and ticks removed from voles, were dehydrated, sputter coated, critical point dried and observed by scanning electron microscopy. Identification of parasites was based on accepted morphological criteria from light and scanning electron microscopy.

Results

From samples in May and July, 1989, 37 of 97 voles were infected with Babesia microti. With the exception of the site designated Bear Grass Meadow located near Lizard Creek in which no animals were collected in May, infected animals were found at all sites during both sample periods. A slightly greater proportion (61%) of the animals trapped in May was infected compared to those trapped in July (47%). The highest incidence of those infected (86%) was found in May from the site designated Moose Calf Meadow located approximately 1 km east of Jackson Lake Junction the lowest incidence of those infected (7%) was in July from Depletion Meadow, located at Jackson Lake Junction. Babesia microti was also found in five of 12 meadow voles (Microtus pennsylvanicus), in one of three water voles (Arvicola richardsoni), but was not found in any of the 11 white-footed mice (Peromyscus leucopus) that were captured. Spleens of infected animals were diagnostic even when the parasitemia was low.

The ticks removed from trapped animals were adult and nymph stages of Ixodes eastoni. This is a record for Grand Teton National Park for this tick species and extends the known range beyond extreme eastern Wyoming. Initial attempts to transmit Babesia to hamsters with captured ticks were not successful.

Giardia sp. remains the most common intestinal parasite found in the small mammals of Grand Teton National Park. The incidence of Giardia from M. montanus was 97%. Other parasites of note included a Hepatozoon sp. and a Trypanosoma sp. A new species of intestinal parasite from shrews, Cochlosoma soricis, was described (Watkins, O'Dell and Pinter, 1989).

Conclusions

The montane vole and the meadow vole are the primary reservoirs of Babesia microti in Grand Teton National Park, while the white-footed mouse appears to be only a minor host. Because these observations are contrary to those of Spielman, et al (1979), more collections of white-footed mouse will be necessary to confirm our results. Ixodes eastoni is the most likely candidate for the vector of Babesia. Transmission studies will be required to document this tick as the vector. Because I. eastoni is a nest tick and completes its life cycle within the nest, the potential for human exposure is probably greatly reduced.

Literature Cited

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