Capillaria hepatica (NEMATODA: TRICHURIDAE) IN PRONGHORN ANTELOPE (Antilocapra americana ORD) IN ALBERTA

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Capillaria hepatica (NEMATODA: TRICHURIDAE) IN PRONGHORN ANTELOPE (*Antilocapra americana* ORD) IN ALBERTA

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Abstract: During January and February, 1971, 41 carcasses of pronghorn antelope (*Antilocapra americana* Ord), killed by vehicles, starvation and predators in southeastern Alberta, were examined. Livers of four does contained white to yellow lesions beneath Glisson's capsule and within the hepatic parenchyma. Histopathologic examination revealed numerous ova of *Capillaria hepatica* (Bancroft 1893). Ova were surrounded by granulomatous reactions characterized by collagenous fibers and fibrous tissue; many were fragmented and contained calcium and iron salts.No adults were found. Widespread granulomatous reactions and mineralized, fragmented ova suggested that ova were non-viable and that pronghorn antelope are accidental and unsuitable hosts. This is the first published record of *C. hepatica* in pronghorn antelope specifically, and in North American ruminants, generally.

INTRODUCTION

During some winters, deep snow in southern Alberta forces pronghorn antelope to move to areas where reduced snow depth facilitates travelling and foraging. In January and February, 1971, 126 of an estimated 250 such animals which had gathered along the relatively snowfree railway and highway right-of-ways approximately 16 to 40 km northwest of Medicine Hat, Alberta, succumbed to train and other vehicle kills, starvation and predation. Subsequently, 41 frozen carcasses were forwarded to our laboratory to assess factors such as age, pregnancy rates, condition, and parasitic loads. During necropsy, hepatic lesions caused by the nematode *Capillaria hepatica* were observed.

MATERIALS AND METHODS

Carcasses were thawed and subsequently examined by a standard necropsy protocol for ruminants. Ages were assessed using the tooth eruption and wear technique of Dow and Wright.[4] Kidney fat indices, back fat, and femoral bone marrow evaluations were recorded as indicators of condition.

Tissues for histopathologic examination were trimmed to approximately 3 mm thickness, fixed in 10 percent neutral buffered formalin, processed in several changes of ethyl alcohol, xylene and paraffin, and cut at 6 μ. Sections were stained by the hematoxylin and eosin (H & E), Gomori's Trichrome, von Kossa's, Perl's, and Verhoeff - van Gieson's methods, respectively.

The Ziehl-Neelsen technique was used to examine for acid-fast bacteria. Fecal samples were screened using a flotation method[1] to determine the presence of ova of gastro-intestinal helminths.

RESULTS AND DISCUSSION

The livers of 4 does aged 8 months, 2½, 3½, and 4½ years, respectively, revealed lesions visible grossly beneath Glisson's capsule and within the hepatic parenchyma as irregularly distributed white to yellow foci measuring 1-2 mm

in diameter. On incision, the lesions were found to be hard, gritty, and apparently mineralized. The livers of the three mature does were severely affected, whereas only few foci were seen in the liver of the juvenile.

Histopathologic examination revealed numerous bipolarly operculate ova, subsequently identified on the basis of morphology and size as those of *C. hepatica*[6] (Fig. 1). Ova were surrounded by granulomatous reactions characterized by massive zones of mature fibrous tissue and collagenous fibers, with light peripheral accumulations of lymphocytes and plasmacytes. Mild bile duct proliferations were also seen. In many cases, granulomas were contiguous and occasionally coalesced. Within the granulomas, individual ova or in some cases entire clusters of ova were fragmented and contained deposits of calcium and iron salts. No adult nematodes were observed.

The presence of mature granulomas with mineralization of ova suggested that the infections were long-standing; in the case of the juvenile doe these could not have been older than 8 months. These lesions suggested that most, if not all, ova were non-viable.

Examination of fecal samples revealed low to moderate numbers of ova of the family Trichostrongylidae but no ova of *Capillaria* sp. were observed. *Mycobacterium* sp. were not associated with mineralization as no acid-fast bacteria were revealed in stained smears of liver.

Most carcasses revealed moderate to severe depletion of major fat depots. However, kidney fat indices, femoral bone marrow evaluations, and carcass weights of the four individuals infected with *C. hepatica* fell within the ranges of condition factors for the other 37 carcasses examined. Eighteen of the 41 animals examined were mature females and all were pregnant.

Layne[5] has reported a strong preponderance of *C. hepatica* infections in Florida rodents occupying scrub habitats which had fine, sandy, excessively well-drained soils. The soil type in the area from which the infected antelope were recovered is classified as loam to silt

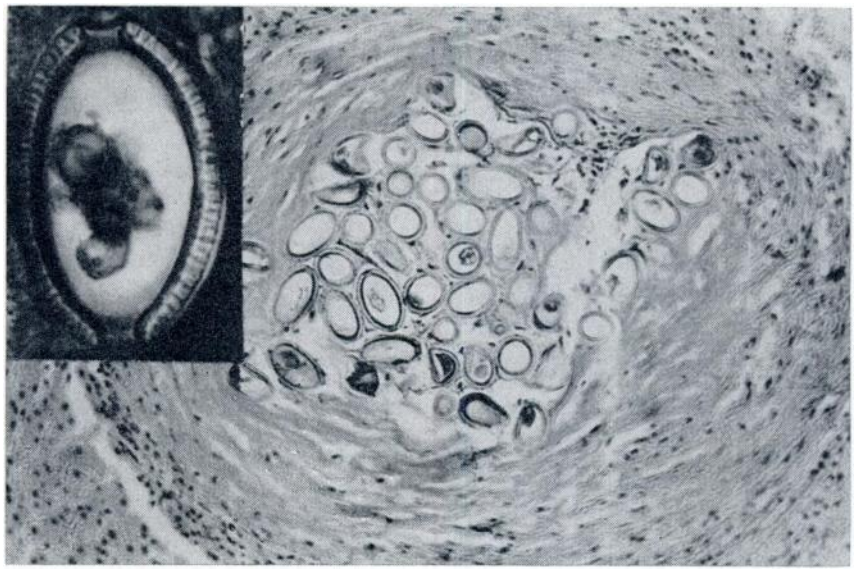

FIGURE 1. Hepatic granuloma containing ova of **C. hepatica** in pronghorn antelope, H. & E. x 280. Note bipolar operculate ovum, inset, H. & E. x 790.

loam.[8] The topography is relatively flat but has more than adequate drainage for an area in the 12 to 14 inch annual precipitation zone.[3] The vegetation is composed of predominantly graminaceous taxa characterized by a spear grass *(Stipa comata)* — blue grama *(Bouteloua gracilis)* habitat type; tree species are rare and shrubs are uncommon.

Soil and vegetation characteristics northwest of Medicine Hat differ markedly from the scrub habitat reported by Layne to be so closely related to the distribution of *C. hepatica* in Florida rodents. However, the area near Medicine Hat supports high populations of *Citellus richardsonii, Thomomys talpoides,* and *Peromyscus maniculatus,* all of which have been parasitized by *C. hepatica* in Alberta.[2,6,7]

Layne's[5] summary of the North American host records for *C. hepatica* reveals that rodents are the principal hosts. Similarly, the only published records for hosts of *C. hepatica* in Alberta have been *C. richardsonii*,[2] *T. talpoides,* and *P. maniculatus*.[6,7] This report is the first published record of *C. hepatica* in North American ruminants. The only other occurrence of *C. hepatica* in pronghorn antelope, known to the authors, is an unpublished record of the University of Alberta (W. M. Samuel and J. C. Holmes, personal communication) which shows ova of this nematode in a male killed by a train in October, 1963, near Pollockville, Alberta. The distribution, known host records and life cycle of this nematode suggests that pronghorn antelope are accidental hosts and that these infections represent a deviation from the rodent-cannibalism and/or rodent-predator-rodent cycles of this parasite. In addition, the extent of host reaction suggests that pronghorn antelope are accidental and unsuitable host for *C. hepatica.*

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