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CAPILLARIA AEROPHILA (CREPLIN, 1839) TRAVASSOS, 1915 (NEMATODA:TRICHUROIDEA) IN RED AND GRAY FOXES OF SOUTHERN ILLINOIS.

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ABSTRACT

Capillaria aerophila was observed in the mucosa of the trachea and bronchi of 51 (31%) of 165 red foxes (*Vulpes vulpes*) from Union, Jackson, and Williamson Counties between November, 1960 and February, 1964 and in the mucosa of the trachea and bronchi of 60 (11%) of 543 gray foxes (*Urocyon cinereoargenteus*) from Jackson, Johnson, Union and Williamson Counties in southern Illinois between November, 1959 and November, 1963. The prevalence of *C. aerophila* in *V. vulpes* from southern Illinois is similar to that reported from red foxes in most geographical localities of the contiguous United States. The magnitude of specimens of *U. cinereoargenteus* examined for *C. aerophila* in other studies allowed little basis for comparative evaluation. It was concluded that while *V. vulpes* constitutes an important reservoir host for *C. aerophila* in southern Illinois, *U. cinereoargenteus* is probably an incidental host and does not represent a serious threat as a source of this lungworm for other animals.

INTRODUCTION

The distribution, host specificity and life cycles of wildlife parasites have been emphasized as important factors in determining guidelines for wildlife management programs (LaRue, 1933; Swales, 1933; Allen, 1934; Van Cleave, 1937). Wild animals with high population densities and wide geographic distributions may

distribute their parasites to numerous habitats and other species of animals. The importance of such hosts in the epizootiology of diseases of wildlife species as well as certain zoonoses of humans and domestic animals has resulted in increasing interest in their parasites by mammalogists, parasitologists, wildlife researchers, veterinarians and clinicians.

Because of omnivorous tendencies, the red fox (*Vulpes vulpes* L.) and the gray fox (*Urocyon cinereoargenteus* (Schreber)) are exposed to a wide variety of parasites and as such consititute important reservoirs for parasites which may be transmitted to other wild carnivores, domestic animals and human beings. When considering the importance and value of red and gray foxes as wildlife entities, data concerning parasitism is pertinent to understanding their ecology.

Due to the paucity of information on the prevalence of the fox lungworm, *Capillaria aerophila* (Creplin, 1839) Travassos, 1915 (syns., *Trichosomum aerophilum* Creplin, 1839, *Eucoleus aerophilum* (Creplin, 1839) Dujardin, 1845, *Capillaria (Thominx) aerophila* (Creplin, 1839) Travassos, 1915) in *V. vulpes* and *U. cinereoargenteus* in Illinois, a four year survey was conducted in which 708 wild foxes were examined. This report not only constitutes the most extensive survey of red and gray foxes for *C. aerophila* in southern Illinois but the most extensive and third most extensive survey of this nematode with reference to gray and red foxes, respectively, in the contiguous United States.

MATERIALS AND METHODS

One hundred and sixty-five red foxes were either shot or trapped in Jackson, Williamson, and Union Counties, southern Illinois between November, 1960 and February, 1964. Likewise, 543 gray foxes were similarly taken in Johnson, Jackson, Williamson, and Union Counties between November, 1959 and November, 1963.

Necropsies were performed either soon after death or the carcasses were frozen for examination at a later date. The nasal sinuses, laryngeal region, trachea, and bronchi were scrutinized for nematodes and the lung tissue pressed between glass plates for examination under a dissecting microscope.

All nemotodes were washed in fresh saline. Live material was fixed in hot 70% ethanol and stored in 70% ethanol containing 5% glycerin. Dead nematodes were fixed and stored in a 5% glycerin-ethanol solution. Specimens were cleared by standard glycerin dehydration techniques. All nematodes were temporarily mounted in pure glycerin and studied by light and phase contrast microscopy.

RESULTS

Of the 543 *U. cinereoargenteus* collected from four counties over a period of 48 months, *Capillaria aerophila* was observed in the mucosa of the trachea and brochi of 60 (11%) animals, while 51 (31%) of 165 *V. vulpes* collected from three counties over a period of 40 months were infected. Because foxes were collected at intervals and not systematically by months over a period of several consecutive years, there are insufficient data to form any convincing conclusions on the seasonal dynamics of *C. aerophila*.

DISCUSSION

The literature is very sparce on reports of *Capillaria aerophila* in wild foxes of the contiguous United States. Further, comprehensive surveys of this lungworm in wild foxes are indeed few, allowing little basis for comparative evaluation. Buechner (1944) found 1 of 11 gray foxes from Texas infected with this helminth. Goble and Cook (1941) reported *C. aerophila* in the trachea and lower bronchi of 22 (55%) of 40 *Vulpes vulpes* from Albany and Greene counties, New York. The following year, Goble and Cook (1942) reported *C. aerophila* in 66 (35%) of 190 red foxes and 6 (7%) of 89 gray foxes from Albany, Greene and Washington Counties, New York. Zeh et al. (1977) detected *C. aerophila* in 87 (41%) of 211 red foxes and 25 (28%) of 89 gray foxes taken in five eastern and several central counties of New York.

The prevalence of *C. aerophila* in *Vulpes vulpes* from southern Illinos is similar to that reported in this host from most geographical localities. The magnitude of specimens of *Urocyon cinereoargenteus* examined in the present study constitutes the most extensive survey for *C. aerophila* in gray foxes in the contiguous United States. Examinations of larger host populations from other geographical localities are needed for comparative evaluation. The finding of 11% of *Urocyon cinereoargenteus* infected with *C. aerophila* in the present study is slightly higher than that reported by Goble and Cook (1942). The report of a 28% prevalence of this lungworm in gray foxes from five eastern and several central counties of New York (Zeh et al., 1977) is high compared to either Goble and Cook's report (1942) or to the present study. However, this may be due to differences is a variety of ecological factors, namely, host population densities, age of the host, climatic conditions, season, length of the study period, and accessibility of paratenic hosts.

Life cycle studies reported by Christenson (1938) reveal that eggs of *C. aerophila* are either coughed out or swallowed and passed out with the feces. They develop to the infective stage in 5 to 7 weeks, and remain viable for over a year. Eggs survived the winter in Minnesota when the temperature was as low as –26°C. Infection results following ingestion of eggs which hatching in the intestine and the larvae migrate to the lungs presumably by way of the circulatory system. Here they develop further and reach maturity approximately 40 days post infection. Borovkova (1949) reported that earthworms, *Lumbricus* and *Allolobophora* can serve as transport hosts. Thus, foxes may become infected with *C. aerophila* by ingesting either viable eggs or possibly be ingesting earth worms containing viable larvae.

The life cycle and prevalence of infection of *C. aerophila* in *V. vulpes* suggests that this wild carnivore constitutes an important reservoir host for this lungworm in other wild animals and domestic animals as well. However, the low prevalence of *C. aerophila* in *U. cinereoargenteus* reported in the present study suggests that the gray fox is probably an incidental host and does not represent a serious threat as a source of *C. aerophila* for other animals in southern Illinois. Further studies are warrented to update this data and to determine whether gray foxes have a role in the epizootiology of *C. aerophila* infections in this area.

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