A SURVEY OF RED FOXES (*VULPES VULPES*) FOR *ECHINOCOCCUS MULTILOCULARIS* IN SOUTHERN ILLINOIS

William G. Dyer and Willard D. Klimstra
Department of Zoology
Southern Illinois University at Carbondale
Carbondale, Illinois 62901

ABSTRACT

One hundred and eighty-three *Vulpes vulpes* collected in Union, Williamson, and Jackson counties, southern Illinois between February 1959 and February 1964 were examined for *Echinococcus multilocularis*. None were found infected with this cestode.

INTRODUCTION

The etiological agent of alveolar hydatid disease was first reported on the North American continent by Rausch (1956) who found cestodes of *Echinococus multilocularis* Leuckart, 1863, in the arctic fox, *Alopex lagopus* L., and the red fox, *Vulpes vulpes* L., on the mainland of Alaska. Because of the wide occurrence of *E. multilocularis* in Alaska and because sylvatic infection may be expected to occur whenever the predator-prey relationships existing between foxes and microtine rodents favor completion of the life cycle, Rausch (1956) predicted the establishment of this tapeworm into high-boreal regions of southern Canada and the contiguous United States.

Six years later, the first report of *E. multilocularis* on the Canadian mainland was established by Choquett *et al.* (1962) when this species was detected in *A. lagopus* from Eskimo Point on the western shore of Hudson Bay, Northwest Territories. Subsequent reports of *E. multilocularis* in carnivores and rodents from Canada have been numerous. Hnatiuk (1966) reported the multilocular hydatid stage of *E. multilocularis* in a meadow vole, *Microtus pennsylvanicus* Ord., near Saskatoon, Saskatchewan and in (1969) the adult stage in *V. vulpes* from Saskatchewan. Leiby *et al.* (1969) found deer mice, *Peromyscus maniculatus* (Wagner) near Stony Mountain and Argyle, northwest of Winnipeg to be infected with the larval stage of *E. multilocularis*. This cestode was reported in *P. maniculatus*, 10 miles north of this area at Gunton by Lee (1969). Baron (197]0) found this tapeworm in *V. vulpes* from southern Manitoba. Recently, Samuel *et al.* (1978) reported it in coyotes, *Canis latrans* Say, and *V. vulpes* from southeastern Manitoba.

Adult cestodes isolated from *V. vulpes* in North Dakota by Leiby and Olsen (1964) and identified morphologically as *E. multilocularis* established the first oc-

currence of this species in the contiguous United States. Eggs from *E. multilocularis* recovered from red foxes in North Dakota were fed to cotton rats (*Sigmodon hispidus*) by Kagan *et al.* (1965) and infection in this host was obtained. This constituted biological verification of the occurrence of this species in the contiguous United States. The same year, Leiby (1965) found *M. pennsylvanicus* and *P. maniculatus* from North Dakota infected with the alveolar larval stage of this parasite, demonstrating that the sylvatic cycle of this cestode was established in North Dakota. The following year, Leiby (1966) reported this cestode from *V. vulpes, M. pennsylvanicus, P. maniculatus* and feral house mice, *Mus musculus* L. in North Dakota. The finding of this parasite in *P. maniculatus* and *V. vulpes* in Minnesota by Carney and Leiby (1968) constituted an eastern and southern extension of the known geographic range of this cestode in the contiguous United States. Leiby *et al.* (1970) found adult cestodes in *V. vulpes* from Iowa, Minnesota, North Dakota, and South Dakota and in *C. latrans* in Iowa, Montana, North Dakota and South Dakota. They also reported the larval stage of this tapeworm in *P. maniculatus* from Iowa, Minnesota, Montana, North Dakota, and South Dakota, in *M. pennsylvanicus* from Iowa and North Dakota, and in *M. musculus* from North Dakota. Iowa, Montana, and South Dakota represented extension of this cestode's known geographic range in the contiguous United States.

Because conditions for completion of the life cycle of *E. multilocularis* are equally favorable in southern Illinois, the date presented in this report deals with the examination of 183 *V. vulpes* collected over a 5-year period.

MATERIALS AND METHODS

One hundred and eight-three (94 males and 89 females) red foxes were either shot or trapped in Union, Williamson and Jackson counties, southern Illinois, between February 1959 and February 1964.

The carcasses were immediately frozen and transported to the laboratory. Subsequent to thawing, the small intestine of each fox was opened, flushed with tap water and the mucosa and perfusate examined under a dissecting microscope for the presence of *Echinococcus multilocularis*. Other cestodes were fixed in alcohol-formalin-acetic acid (AFA) for future identification.

RESULTS AND DISCUSSION

Of the 183 red foxes collected over a 5-year period from the three counties in southern Illinois, none were found infected with *E. multilocularis*. Examination of other carnivores from this area (unpublished data) has also not revealed the presence of this cestode.

As pointed out by Leiby *et al.* (1970), the widespread sylvatic occurrence of this cestode in the north central states is significant in zoonotic public health. While the presence of *E. multilocularis* in red foxes from souther Illinois has not been established by the present study, personnel who handle carcasses of foxes are warned to take precautions to avoid contamination with the eggs of this parasite. Further, as data have not been collected subsequent to 1964, there is indeed a need to update the data base to determine whether Illinois represents a southern extension of the known geographic range of this tapeworm.

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