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Authors: MORRISON, EDWARD E., and GIER, H. T.

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LUNGWORMS IN COYOTES ON THE GREAT PLAINS

EDWARD E. MORRISON and H. T. GIER, Department of Anatomy and Physiology, Kansas State University, Manhattan, Kansas 66506, USA

Abstract: A total of 395 coyotes (*Canis latrans*) was examined in the field for lungworms (*Filaroides osleri* and *Capillaria aerophila*) with 60 trachea and bronchial trees returned to the laboratory for detailed examination. Coyote carcasses were obtained from eight central states (Oklahoma, Colorado, Wyoming, Iowa, South Dakota, Nebraska, Texas, and three regions of Kansas). Cysts of *F. osleri* were present in the trachea or first division of bronchi of 68 (17%) of the coyotes examined. *C. aerophila* infections were identified during field examinations, primarily by the excess mucus in the bronchi, in 151 (38%) coyotes. Nearly 6% of the coyotes examined were infected with both lungworm species. A total of 195 (49%) coyotes had at least one species of lungworm. *Filaroides* was less frequent in Iowa and Kansas; *Capillaria* infections were present in at least 30% of the coyotes examined at all stations.

INTRODUCTION

The coyote (*Canis latrans*) is the principle predator on the Great Plains, and is valuable in maintaining ecological balance in wildlife populations. Coyotes may be an important reservoir for certain diseases and parasites transmissible to domestic dogs.

The number of coyotes increased significantly during the late 1960's and reached a maximum population in 1973, then declined in successive years. Holmes and Podesta³ reviewed the recorded helminths reported from coyotes prior to this peak in population.

Lungworm infections have been reported from Minnesota² and Montana (Seese, pers. commun.). Isolated infections with *Filaroides osleri* have been reported in Colorado,⁴ from as far north as Alberta,³ and as far south as southeastern Texas.⁵ Thornton⁵ reported nodules 2-6 mm in diameter present in the tracheal mucosal tissue in four coyotes from southeastern Texas. Erickson² found what he thought to be *F. osleri* in 4 of 65 coyotes from Minnesota. Seese (pers. commun.) reported *F. osleri* in 9 of 27 coyotes in Montana, and Holmes and Podesta³ reported infections

in 11 of 75 coyotes examined in northern Alberta.

Holmes and Podesta³ were the first to record *Capillaria aerophila* in coyotes, finding 4 of 75 (5.3%) infected. No other reports of coyote infection by *C. aerophila* have been found.

This survey was undertaken to determine the occurrence of lungworm in coyotes on the Great Plains.

MATERIALS AND METHODS

Coyotes utilized in this study were obtained from trappers, hunters and fur dealers. Between 17 January and 15 April 1977, 395 carcasses were examined in the field for lungworm, with 60 trachea and bronchial trees returned to the laboratory for verification by microscopic examination. Trachea and primary bronchi were opened and thoroughly inspected for lungworms, excessive heavy stringy mucus and mucosal cysts. Mucus was examined under the dissection microscope for free *C. aerophila* and dislodged *F. osleri*. Thick mucus was partially digested with 0.5% trypsin solution to free imprisoned nematodes otherwise undetectable. Nodular cysts were removed from the

trachea and prepared for histopathologic examination.

RESULTS AND DISCUSSION

Cysts of *F. osleri* were found in 68 of the 395 (17%) coyotes examined. The number observed ranged from a single cyst, usually located at the tracheal bifurcation, to as many as 30 separate cysts, extending from the larynx to the secondary bronchi. Cysts of *F. osleri* ranged in size from 1-5 mm, each containing a single nematode, to 5-20 mm containing two to 20 or more nematodes. Prevalence of *F. osleri* was highest in eastern Wyoming and Oklahoma, and lowest in Kansas and southwest Iowa (Table 1).

As many as 30 *F. osleri* nodules were present in the trachea from one coyote. The nodules partially occluded the trachea and bronchial lumen, undoubtedly causing dyspnea. Examination of the larger nodules revealed coiled masses of adults, the size of the nodule relating to the number of nematodes in that nodule. The surface of the nodules were roughened and nematodes, probably females, protruded into the lumen of the trachea.

C. aerophila was identified in 151 of the 395 (38%) coyotes examined. Infections were identified in the field by visual inspection of the parasite in trachea and

primary bronchi or by the presence of heavy stringy mucus. Twenty-four of 36 lungs considered positive by field examination were confirmed in the laboratory, an accuracy of 75% for field determinations. No *C. aerophila* were found in any of the 24 lungs recorded as negative by field examination. We believe that the detection of the stringy mucus with or without worms visible at the tracheal bifurcation is a more accurate means of detecting *C. aerophila* than is the microscopic examination of the fixed mucus.

C. aerophila infections were present in at least 30% of coyotes examined. No significant difference was observed between the sampled areas (Table 1). Nearly 6% of the coyotes examined were infected with both lungworm species. A total of 195 (49%) coyotes had at least one species of lungworm present.

Nematode specimens are accessioned in the National Parasite Collection and assigned the following numbers: 73070, *Filaroides osleri* and 73071, *Capillaria aerophila*. Agricultural Research Service, Animal Parasitology Institute, Agricultural Research Center, Beltsville, Maryland 20705, USA.

C. aerophila were distributed from the trachea to the terminal bronchioles; however, they were most commonly

TABLE 1. Regions and numbers of coyotes examined for lungworm parasites.

Location	No. of coyotes examined	No. of coyotes infected			
		<i>F. osleri</i>	%	<i>C. aerophila</i>	%
Northeast Kansas	76	1	1	31	41
Southeast Kansas	52	4	8	18	35
Western Kansas	5	0	0	2	40
Western Oklahoma	44	13	30	14	32
Texas Panhandle	38	5	13	19	50
Southeast Colorado	41	8	20	13	32
Wyoming	42	21	50	14	33
South Dakota	72	14	19	25	35
Southwest Iowa	16	1	6	8	50
Nebraska	9	1	11	8	88

found attached to the respiratory mucosa at the junction of the secondary bronchi. Host response to the parasite initiated production of thick stringy mucus which provides a ready diagnostic characteristic for the field identification of a *C. aerophila* infection. Severe infections would cause dyspnea, possibly leading to

interstitial pneumonia as described by Christensen¹ in foxes.

Although there are no previous reports of *C. aerophila* infecting coyotes in the geographic area covered by this study, the data presented from this study confirms that it is well established on the Great Plains.

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