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Coccidian Parasites of Wild Turkeys, *Meleagris gallopavo silvestris*, in Illinois

D. Michael Watkins

Eastern Illinois University

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COCCIDIAN PARASITES OF WILD TURKEYS,

MELEAGRIS GALLOPAVO SILVESTRIS, IN ILLINOIS

(TITLE)

BY

D. Michael Watkins
A.B. Illinois College, 1976

THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF

Master of Science

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY
CHARLESTON, ILLINOIS



I HEREBY RECOMMEND THIS THESIS BE ACCEPTED AS FULFILLING
THIS PART OF THE GRADUATE DEGREE CITED ABOVE

10 August 1979
DATE

10 August, 1979
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The undersigned, appointed by the Chairman of the Department of Zoology,
have examined a thesis entitled

COCCIDIAN PARASITES OF WILD TURKEYS, MELEAGRIS GALLOPAVO SILVESTRIS,
IN ILLINOIS

Presented by

D. Michael Watkins

A.B. Illinois College, 1976

a candidate for the Degree of Master of Science

and hereby certify that in their opinion it is acceptable.

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COCCIDIAN PARASITES OF WILD TURKEYS,
MELCAGRIS GALLOPAVO SILVESTRIS, IN ILLINOIS. D. Michael Watkins

Abstract: Fecal samples from 124 wild turkeys (Meleagris gallopavo silvestris), collected in three southern Illinois counties, were examined for coccidia. Three and two tenths percent (4) of the birds sampled were infected with Eimeria of apparently four different species. These species were tentatively designated as: E. meleagridis, E. adenoides, E. meleagrimitis and E. subrotunda.

Management of wild turkeys (Meleagris gallopavo silvestris) is dependent, among other elements, on understanding the role of parasitism as a population limiting factor. Surveys of parasites in natural and introduced populations of wild turkeys have been carried out in several sections of the United States (Guenther 1976, Jackson et al. 1977, Kozicky 1948, Maxfield et al. 1963, Moore 1947 & 1954, Prestwood 1968, Prestwood et al. 1971, 1973, Self and Brouchard 1950). These studies suggest that parasitic disease may account for a large portion of the 50% to 65% annual mortality not attributable to hunting.

Wild turkeys have been hunted in Illinois only since 1970 and available data on their parasites are meager. The study of Jackson et al. (1977) on gastro-intestinal helminths and the report of Guenther (1976) on parasites observed in blood smears from 152 birds are the only recent analyses of parasites in Illinois wild turkey populations. The thesis by Bridges (1975) mentions infection levels. The present study concentrates on coccidia.

Illinois Department of Conservation Federal Aid Project W-63-R provided partial support for this study. Advice and assistance in

selecting, planning and carrying out the investigation were given by Dr.s R. Andrews, J. Ebinger and B.T. Ridgeway.

MATERIALS AND METHODS

Male turkeys were hunted in the four southern Illinois counties of Union, Jackson, Alexander and Pope during April 1977 and 1978 and in Calhoun County April 1978. Each bird killed was examined at a check station where it was aged, sexed, weighed and the location of kill recorded.

The complete digestive tract was extracted from each turkey and two grams of feces removed from the colon. One gram of each sample was mixed with 20 ml. of 2.5% potassium dichromate solution in a petri dish. The cover of the dish was loosely applied to facilitate air circulation and labeled. These preparations were maintained at room temperature for ten days to promote sporulation of any oocysts present. The remaining gram of each fecal sample was treated using the MIF staining technique of Levine (1973), labeled and stored.

At the end of ten days the dichromate preparations were subjected to a sugar flotation process (Sloss and Kemp 1978) to separate oocysts. Cysts so obtained were examined on wet-mount microslide preparations using 100x and 450x magnification of a calibrated compound microscope. The length and width of oocysts and sporocysts were recorded and other features described. All coccidians were photographed. Identification of coccidia was undertaken using the descriptions in Levine (1973) and Prestwood et al. (1971).

RESULTS

Eimeria spp. were recovered from fecal samples of 4 of 124 male wild turkeys (Table 1). Two of 71 (2.8%) adults and two of 53 (3.8%) juveniles were infected.

One oocyst was found in a fecal sample from an adult turkey killed in Alexander County (Fig. 1a). The oocyst was ellipsoidal, smooth, with no micropyle or residuum. A polar granule was present. The sporocysts were ovoid with residuum and Stieda body. Greatest width of the oocyst was 17.2 microns, greatest length 23.1 microns. Greatest width of the sporocyst was 7.56 microns, greatest length 11.76 microns.

A species of Eimeria was recovered from a juvenile male shot in Jackson County (Fig. 1b). Eleven smooth walled oocysts were observed in the fecal sample. Micropyle and residuum were absent, but a polar granule was present. Greatest width of the oocysts ranged from 14.7 to 19.3 microns (average 16.8 microns). Greatest length varied from 17.01 to 28.56 microns (average 22.59 microns). The sporocysts were elongate ovoid, with residia and a Stieda body. They ranged in length from 8.4 to 12.6 microns (average 10.08 microns), and in width from 5.88 to 8.19 microns (average 7.28 microns).

Another Eimeria sp. was recovered from a juvenile male that was shot from the same flock (Fig. 1c). Three oocysts were observed in the fecal sample from this bird. Oocysts of this species were subspherical, smooth-walled, and a micropyle and residuum were absent. A polar granule was present. Greatest width of the oocysts ranged from 14.7 to 17.6 microns (average 16.4 microns). Greatest length varied from 18.9 to 21.0 microns (average 20.3 microns). The sporocysts were ovoid, with a Steida body and residuum. Sporocysts ranged in length from 8.44 to

Table 1. Eimeria spp. isolated from wild turkeys shot in southern Illinois, 1977 and 1978.

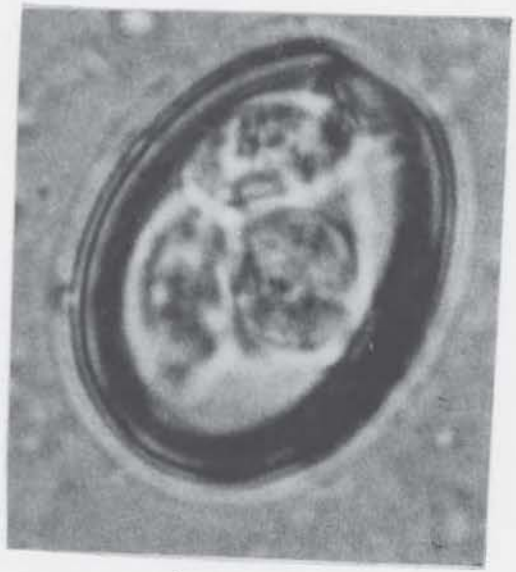
County	No. Killed	No. Examined	<u>Positive</u>	
			No.	%
Alexander	50	25	1	4.0
Pope	9	9	0	-
Jackson	22	18	2	11.1
Union	74	66	1	1.5
Calhoun*	10	6	0	-
<u>Total</u>	<u>165</u>	<u>124</u>	<u>4</u>	<u>3.2</u>

* Kill for 1978 season only.

Table 2. Percentage comparison of wild turkeys infected with Eimeria spp. in Illinois with other areas in the United States.

Area	Birds Examined	Percent with <u>Eimeria</u> sp.
Illinois	124	3.2
Mississippi Delta (Prestwood 1968)	216	46.7*
Southeastern U.S. (Prestwood et al 1971)	321	17.0

*only juveniles examined



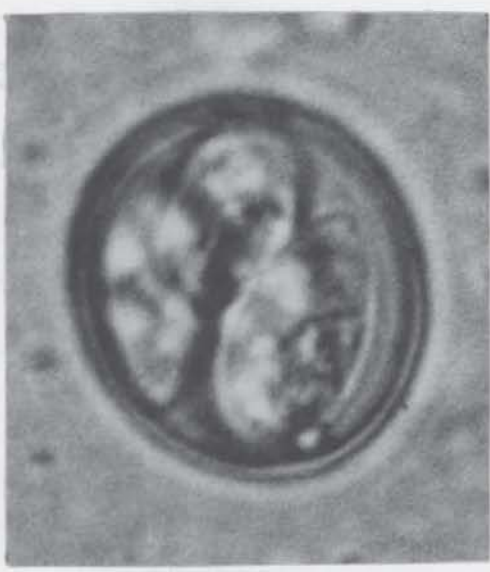
6 μ .

a



6 μ .

b



9 μ .

c



9 μ .

d

Fig. 1. Oocysts of Eimeria spp. from wild turkeys (M. gallopavo silvestris) shot in southern Illinois.

10.08 microns (average 9.25 microns), and in width from 5.06 to 7.98 microns (average 6.42 microns).

Sixty-eight oocysts identified as Eimeria sp. were observed in the fecal sample recovered from an adult male killed in Union County (Fig. 1d). Oocysts of this species were subspherical, smooth-walled, with no micropyle, polar granule or residuum. Greatest width of the oocysts ranged from 16.8 to 22.0 microns (average 18.5 microns). Greatest length ranged between 20.16 and 23.1 microns (average 21.90 microns). The sporocysts ranged in length from 7.9 to 10.5 microns (average 8.63 microns), and in width from 4.6 to 7.8 microns (average 6.0 microns).

DISCUSSION

Wild turkeys (M. gallopavo silvestris) in Illinois appear to have a lower incidence of coccidia than reported for turkeys in other areas of the United States (Table 2). Possibly the original introduced population of turkeys used to stock the area were slightly, or not at all, infected with coccidia. Therefore, the chance of oncoming brood poults ingesting oocysts from other turkeys was, and remains, low. The present population is well dispersed so the chance of infection by coccidia probably is minimal.

The oocyst from the bird killed in Alexander County (Fig. 1a) appears to be Eimeria meleagridis. It followed closely the structural features given by Levine (1973). Eimeria adenoeides (Fig. 1b) is the species in one sample from Jackson County. It too follows closely the structural features and measurements given by Levine (1973) and by Moore and Brown (1951). Eimeria meleagritidis (Fig. 1c) is a common species found in the wild turkey (Peterson, 1949 & Tyzzer, 1929). This species

was present in a fecal sample from one Jackson County bird. Eimeria sp. (Fig. 1d) found in the turkey from Union County appears to be Eimeria subrotunda. This species is uncommon in the wild turkey (Levine 1973) and measurements and structural description are limited. Moore et al. (1954) proposed Eimeria subrotunda as a new species but gave little further information. No additional reports were found.

There seems to be little overlap in the species of Eimeria found and the counties in which the birds were killed. However it must be stressed that the very limited recovery of oocysts from the group of birds examined rules out a firm conclusion. Also the two turkeys killed in Jackson County were somewhat different in appearance from wild turkeys in general. They may have been wild-domestic hybrids or domestic birds.

Juvenile birds in this study showed a higher infection for Eimeria sp. than adults. Juveniles may host more Eimeria sp. because they are confined to a brood as poults, which may enhance the spread of this particular parasite (Prestwood, Kellogg and Doster 1971). Coccidian infections affect poults more severely than adults. (Kozicky 1948). A total of 321 adult and juvenile wild turkeys examined by Prestwood, Kellogg and Doster (1973), showed 50% of 123 juveniles infected with Eimeria sp. as compared to 17% of 198 adults, and Eimeria sp. was found in 46.7% of juveniles examined in the Mississippi Delta region (Prestwood 1968).

In view of the comparatively low infection levels indicated in this particular study further investigation is in order. More refined search techniques and an increased sample size may demonstrate a far larger percentage of Illinois wild turkeys have coccidial infections that the results presented here suggest.

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