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GASTROINTESTINAL PARASITES OF THE EASTERN COTTONTAIL *(Sylvilagus floridanus)* IN CENTRAL PENNSYLVANIA [1]

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Abstract: During a 3 year period, 186 eastern cottontails *(Sylvilagus floridanus)* were trapped from two areas and examined for helminth and protozoan parasites. Fecal samples from 139 were evaluated for coccidia and helminth ova. Nine species of coccidia were identified: *Eimera audubonii, E. azul, E. environ, E. honessi, E. maior, E. minima, E. neoirresidua, E. neoleporis,* and *E. sylvilagi.* Ova from 5 helminth species were found: *Cittotaenia* sp., *Hasstilesia tricolor, Passalurus* sp., a trichostrongyle-type nematode species, and *Trichuris* sp. Five helminths were recovered from stomachs and small intestines: *Cittotaenia* sp. *H. tricolor, Obeliscoides cuniculi, Passalurus ambiguus,* and *Trichostrongylus calcaratus.*

INTRODUCTION

Several detailed reports of internal parasites of *Sylvilagus* spp. and other leporids have been published in recent years.[1,2,4,6,7,8,11,18] While these reports indicated that the parasites of rabbit populations are similar in different areas, with coccidia, cestodes, gastrointestinal nemtodes, and trematodes being present in almost all areas, the particular genera and species do have regional variations. This study was undertaken to identify the gastrointestinal parasites of the eastern cottontail in Pennsylvania, their characteristic dimensions, and prevalence.

MATERIALS AND METHODS

Rabbits were trapped from two areas: a 4.1 ha plot on The Pennsylvania State University Wastewater Renovation Facility on State Game Lands 176 (SGL 176) and, approximately 8 km from this area, a 162 ha area at the State Correctional Institute at Rockview (Rockview), Centre County, Pennsylvania. Unbaited box traps were set at a density of 25 traps/ha with a grid interval of 20 m in early September, 1975-1977; and in March, 1976-1978. Vegetative cover at the SGL 176 area consisted of old field, cultivated field with grain and forage crops, multiflora rose hedge, and scattered pine and hardwood trees. Vegetation on the Rockview area was typified by orchards and old fields.

A total of 186 cottontails was trapped and then euthanized in a CO_2 chamber. At necropsy, animals were examined for lesions and parasites. Fecal samples were analyzed for coccidia and helminth ova, contents of stomachs and small intestines were examined for gastrointestinal parasites. A modification of the McMaster technique[17] was used for egg and oocyst counts. Oocysts were sporulated in 2.5% potassium dichromate for one week and then examined qualitatively.

Stomachs and small intestines were examined with the aid of a dissecting microscope for all animals except those trapped in September, 1975 and March, 1978. Helminths recovered from the stomachs and all intestinal nematodes

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TABLE 1. Species of *Eimeria* recovered, their prevalence, and oocyst dimensions.

	E. audubonii	*E. azul*	*E. environ*	*E. honessi*	*E. maior*	*E. minima*	*E. neoirresidua*	*E. neoleporis*	*E. Sylvilagi*
Oocyst prevalence (%)	14.5	10.1	73.4	17.3	7.2	2.2	33.1	24.5	9.4
Oocyst length									
Mean	20.9	21.9	25.8	27.1	42.6	13.0	25.2	38.1	29.6
Range	17.5-24.5	18.0-27.0	19.0-35.1	21.0-35.0	27.0-48.0	12.0-14.0	20.0-35.0	28.0-46.0	24.0-37.0
Oocyst width									
Mean	16.1	16.6	17.4	17.6	24.8	12.0	16.8	18.4	18.3
Range	12.0-21.0	14.5-19.0	11.0-24.5	14.0-25.5	17.5-30.0	11.0-12.5	12.5-23.0	11.7-26.5	16.0-26.5
Oocyst residuum[a]	-	-	-	3.7	4.6	-	-	1.6	±[b]
Micropyle width	-	-	4.9	4.8	6.2	-	4.7	5.5	5.4
Sporocyst length									
Mean	11.0	11.9	13.1	13.4	18.1	6.1	12.6	15.7	15.1
Range	10.5-13.0	7.8-15.0	10.0-17.5	11.5-17.0	14.0-26.0	4.0-11.0	10.0-17.0	13.5-20.0	12.0-19.5
Sporocyst width									
Mean	5.7	5.6	6.4	6.4	8.0	4.0	6.4	7.2	7.0
Range	5.5-7.0	3.3-6.5	4.5-10.0	4.0-8.5	5.5-11.0	3.0-5.0	5.0-7.5	6.0-10.0	5.5-7.5
Sporocyst residuum[a]	-	2.7	-	-	4.2	+	2.8	5.1	4.3
Refractile globule[a]	3.5	3.8	4.0	4.5	5.5	+	4.0	5.0	5.0
Polar granule	-	-	-	-	-	+	-	-	-

- = Absent; + = Present.

[a]The means represent the diameter of the residua or refractile globule.

[b]Mean residuum size is not presented since not all oocysts had a residuum.

were fixed in formalin for at least 24 h, then mounted with CMCP[☑] mounting media for microscopic examination and species identification. Since this work was part of a larger project, stomach contents were removed and the intestinal sections were received after use in bacteriology and were not sufficiently complete to quantitatively evaluate the total number of helminths present. Means and ranges presented are in micrometers.

RESULTS

Nine species of coccidia (Table 1), three species of nematode ova, one species of cestode ova, and one species of trematode ova were found (Table 2). Five helminths were recovered and identified from stomachs and small intestines: *Cittotaenia* sp., *Hasstilesia tricolor*, *Obeliscoides cuniculi*, *Passalurus ambiguus*, and *Trichostrongylus calcaratus*.

DISCUSSION

Mean dimensions for all *Eimeria* spp., and ova of *Cittotaenia* sp., *H. tricolor*. and *Trichuris* sp. were similar to earlier studies.[6,10,11,13,15,18] Mean dimensions of *Passalurus* sp. ova were slightly greater (108.7 × 50.6) than those reported previously (95.0 - 103.0 × 43.0).[10] Since *P. ambiguus* was consistently identified as the only oxyurid parasite present this suggests that the *Passalurus* sp. ova were from this one species. The mean dimensions of the trichostrongyle-type nematode ova were within the range for *Obeliscoides cuniculi* and *Trichostrongylus* spp. ova;[10] therefore, the ova could not be differentiated.

The prevalence of some helminth ova and coccidia recovered was rather typical of recent surveys.[1,3,8,11,12,18] However, low prevalence was noted for several *Eimeria* spp. and ova of *Cittotaenia* sp., *H. tricolor*, and *Passalurus* sp.[1,4,6,8,12,16] Since most tapeworm ova frequently are passed in proglottids, fecal egg flotation procedures may not reflect true prevalence of a tapeworm infection unless a gravid segment is completely crushed.[5] Thus, absence of tapeworm eggs does not always indicate lack of infection. A low prevalence for *H. tricolor* ova was probably a result of the quantification method used. A more accurate count of trematode ova requires the analysis of a fecal plug formed by centrifugation.[14]

TABLE 2. Species of helminth ova recovered, their prevalence, and ova dimensions.

Ova type	Ova prevalence (%)	Ova length		Ova width	
		Mean	Range	Mean	Range
Cittotaenia sp.	27.0	69.1	50.0-90.0	63.8	40.0-83.2
Hasstilesia tricolor	14.6	22.0	18.2-26.0	14.0	13.0-19.5
Passalurus sp.	11.7	108.7	98.0-123.0	50.6	34.2-74.1
Trichostrongyle-type	46.0	74.7	36.4-85.0	44.4	16.9-65.0
Trichuris sp.	16.1	63.9	63.8-75.0	29.4	23.1-39.6

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