

A SURVEY OF THE GASTROINTESTINAL HELMINTHS OF THE MUSKRAT, *ONDATRA ZIBETHICUS*, COLLECTED FROM TWO LOCALITIES IN OHIO^{1, 2}

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ABSTRACT

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Muskrats, *Ondatra zibethicus* (Linnaeus, 1766), collected from two different habitats in Ohio, a marsh habitat (Ottawa County) and farm pond habitat (Athens County) were examined for gastrointestinal helminth parasites. Three trematodes, *Echinostoma revolutum* (Froelich, 1802), *Quinqueserialis quinqueserialis* (Barker and Laughlin, 1911), *Wardius zibethicus* (Barker and East, 1915), and one nematode, *Trichuris opaca* (Barker and Noyes, 1915) were recovered. Prevalence of the individual helminth species were compared by host habitat, and significant differences were observed between the two host habitats for two of the trematode species and the nematode species.

There is little information concerning the parasitism of wildlife populations which stresses the role of the external environment of the host. There have been numerous studies dealing with the host-parasite relationship, but little attention has been given to the influence of the host habitat on the success of the parasite. The objective of this investigation was to make a comparative survey of the gastrointestinal helminths parasitizing muskrats collected from two different areas of Ohio. One of the host habitats was located along the marshes of Lake Erie in northwestern Ohio and the other host habitat consisted of farm ponds located in southeastern Ohio.

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METHODS

A total of 100 muskrats obtained during the 1973-74 Ohio trapping seasons were examined to determine the helminths parasitizing the gastrointestinal tract. A total of 75 muskrats were collected by a local trapper from the Lake Erie marshes of Carroll Township in Ottawa County, Ohio in the northwestern part of the state; 25 muskrats were collected by a local trapper from farm ponds in Waterloo Township in Athens County, Ohio located in the southeastern part of the state.

The organs of the gastrointestinal tract, stomach through large intestine, were examined for the presence of helminths. The helminths recovered were stored in 70% ethyl alcohol and fixed in Lavdowsky's A.F.A. fixative. The helminths were cleared and mounted in the usual manner (Cable, 1958).

Statistical analysis employing the phi coefficient (ϕ) was used to determine if the differences observed for each species compared by host habitat were significant. The formula for the phi coefficient is:

$$\phi = (AD - BC) / \sqrt{(A+B)(C+D)(A+C)(B+D)}$$

where A is the number of muskrats infected with the species from Ottawa County, B is the number of muskrats infected with the species from Athens County, C is the number of muskrats not infected with the species from Ottawa County and D is the number of muskrats not infected with the species from Athens County. The ϕ coefficient is then squared and the resulting value is read from a chi-square table (personal communication from Harold Reed, Ohio University).

RESULTS AND DISCUSSION

Three trematode species, *E. revolutum*, *Q. quinqueserialis* and *W. zibethicus* were recovered. *T. opaca* was the only nematode species recovered. All helminths recovered in this study have been previously reported from Ohio muskrats (Rausch, 1946; Beckett and Gallicchio, 1967). A comparison of the *P* values, location in the host, and the average number of parasites per infected host for each helminth from the two different habitats is shown in table 1. Ninety-six per cent of the Ottawa County (marsh habitat) muskrats and 97% of the Athens County (farm pond habitat) muskrats

TABLE 1
Results of a survey of the gastrointestinal helminths of 100 Ohio muskrats.

Parasite	Habitat	Location	Average range	P value
<i>Echinostoma revolutum</i>	marsh ¹	Small intestine	15.3 (1-124)	0.1
<i>Quinqueserialis quinqueserialis</i>	marsh	Cecum	18.8 (1-59)	0.05
	marsh	Cecum	33.5 (1-251)	
<i>Wardius zibethicus</i>	marsh	Cecum	15.6 (4-39)	0.05
	marsh	Cecum	5.7 (1-16)	
<i>Trichuris opaca</i>	marsh	Cecum	7.8 (1-57)	0.01
	marsh	Cecum	2.0 (1-5)	
	farm pond		3.0 (3)	

¹Ottawa County, marsh.

²Athens County, farm pond.

were infected with one or more of the helminths. This observation suggests that the differences in host habitat did not play a significant role in determining the total percentage of muskrats parasitized from each locality. The influence of the host habitat, however, appears to be a factor in regard to the incidence of individual helminth species.

Eighty-nine per cent of the hosts in Ottawa County and 96% of the hosts in Athens County were infected with *E. revolutum*. There was no significant difference, however, in the incidence of this helminth from the two localities (table 1).

Q. quinqueserialis and *W. zibethicus* both were statistically different when comparing their incidences with host habitat. Seventy-six per cent of the Ottawa County muskrats and 56% of the Athens County muskrats were infected with *Q. quinqueserialis* and 21% of the Ottawa County and 40% of the Athens County muskrats were infected with *W. zibethicus*. *T. opaca* showed the most significant difference in incidence between the two host habitats. Thirty-two per cent of the muskrats in Ottawa County were infected with this helminth while only 4% of the Athens County muskrats were so infected.

The host habitat appeared to have a significant influence on the incidences of *Q. quinqueserialis* and *W. zibethicus* and an even greater influence on the incidence of *T. opaca*. Differences in the densities of the muskrat populations in each of the habitats alone cannot account for the observed differences in incidence, since the incidence differences were not con-

sistent. *Q. quinqueserialis* has a higher incidence in the marsh habitat (Ottawa County) than in the farm pond habitat (Athens County), while the reverse was true for *W. zibethicus*. The many factors which may influence the epidemiology of individual helminth species are not well enough known to make a meaningful hypothesis concerning the control of parasite prevalence.

The results obtained in this survey concur with the findings of Hunter and Quay (1953), who found significant differences in parasitism in host populations collected from two different habitats. This work also supports the contention of Anderson and Beaudoin (1966) concerning the desirability of including ecological data in reporting the results of parasitological surveys.

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