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## HELMINTH PARASITES IN SNOWSHOE HARES FROM NORTHERN MICHIGAN

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**Abstract:** The incidence of helminth parasites in snowshoe hares (*Lepus americanus*) was studied in 1957-1962 in Michigan's Upper Peninsula. Seventy-five hares were examined for the presence of all helminths, 210 only for certain parasites. Adult tapeworms were present in 5 of 75 (6.7%) hares examined, cysticerci of *Taenia pisiformis* in 88 of 210 (41.9%), and coenuri of *Multiceps* sp. in 15 of 179 (8.4%). Nine genera of nematodes were found. *Obeliscoides cuniculi* occurred most frequently, *Nematodirus* sp. least frequently. *Protostrongylus* sp. and *Obeliscoides cuniculi* appeared to produce pathogenic effects, and *Multiceps* sp. and *Dirofilaria scapiceps* may have impaired movement of some hares.

Helminth parasites were collected from snowshoe hares in Michigan's Upper Peninsula to determine frequency of occurrence, relative abundance, and influence on host. Data on helminth parasites of Michigan hares have not been available previously. The information presented further documents the known distribution of these parasites over the extensive geographic range of the snowshoe hare.

### METHODS

Hares examined were collected from the Ottawa National Forest (n = 75) during the summers of 1957 and 1958 only and from Alger and Schoolcraft Counties (n = 210) throughout the year during the period 1959-1962.<sup>1</sup> Methods of collecting were live-trapping, shooting, snaring, and recovering road kills. Carcasses first were palpated and skinned, then examined for subcutaneous parasites. Gastrointestinal tracts were removed and opened. Contents and scrapings from linings were washed in a soil analysis screen with a mesh diameter of 0.5 mm to facilitate recovery of parasites. Most hares collected in Alger and Schoolcraft Counties were not examined intensively for parasites, and usually only those helminths occurring outside the gastrointestinal tract were sought and recovered. Lungs were pressed a portion at a time

between two panes of glass held against a strong light to locate lungworms.

### RESULTS

Five of 75 hares examined harbored 16 adult tapeworms. These were not identified to Genus but probably were Anoplocephalidae. Eight tapeworms were carried by a 3-month-old juvenile hare, 2 by a juvenile 9 to 10 weeks old. Adult tapeworms were collected from 2 adult hares. Adult cestodes do not appear to be of common occurrence in Upper Michigan hares of any age. Cysticerci of *Taenia pisiformis* were of common occurrence. Usually they were found attached to the mesentery of the lower digestive tract, particularly that portion of the colon immediately anterior to the anus. Cysticerci occurred in the liver, stomach, and diaphragm as well as in the musculature, and frequently they were lying free in the coelomic cavity. This parasite apparently is commonly encountered over the greater portion of the hare's range.<sup>2,3,4</sup>

Coenuri of *Multiceps* sp. were less commonly encountered. Only 15 of 179 hares carried these larval tapeworms, usually called "blisters" by rabbit hunters. There were some indications of mechanical damage by this parasite. In one hare a *Multiceps* cyst was attached to the parietal pericardium of the heart and completely filled the pericardial sac.

TABLE 1. Summary of occurrence of helminth parasites in Upper Michigan snowshoe hares.

Parasite	Number of Hares Examined	Number of Hares Infected	Percentage of Hares Infected	Largest Single Infection	Mean Number of Parasites per Hare Infected	Standard Error of Mean
<i>Anoplocephalidae</i> (adult)	75	5	6.7	8	3.6	2.24
<i>Taenia pisiformis</i> — <i>cysticerci</i>	210	88	41.9	54	7.4	1.01
<i>Multiceps</i> sp.— <i>coenuri</i>	179	15	8.4	3	1.4	0.05
<i>Obeliscoides cuniculi</i>	73	70	95.9	1,591	363.8	42.53
<i>Protostrongylus boughtoni</i>	106	47	44.3	37	6.1	1.10
<i>Trichostrongylus</i> sp.	71	61	85.9	4,955	268.3	86.43
<i>Passalurus ambiguus</i>	72	30	41.7	5,325	480.0	194.0
<i>Trichuris leporis</i>	73	39	53.4	111	18.9	4.70
<i>Nematodirus</i> sp.	70	9	12.9	515	76.7	59.5
<i>Dirofilaria scapiceps</i>	173	111	64.2	52	7.9	1.32

Physical pressure on the heart probably occurred in this instance. Another hare carried a huge blister which occupied almost the entire right half of the coelomic cavity. The liver was dislodged from its normal position and was situated in the center of the cavity. The cyst appeared to exert pressure anteriorly on the diaphragm as well. In other instances *Multiceps* cysts occurred just beneath the skin near the joints, especially in the shoulder areas, and movement by the host likely was impaired.

The nematode found in greatest numbers was the stomach worm, *Obeliscoides cuniculi* (Table 1). Damage to the stomach wall was seen in a few hares with heavy infections by this parasite. Sloughing of the inner wall was accompanied by the presence of a thick, yellowish fluid which surrounded the bolus of food and enveloped most of the nematodes.

The rabbit lungworm, *Protostrongylus boughtoni*, was found in 47 of 106 hares examined. No effort was made to recover lungworm larvae. Lungs infected by *Protostrongylus* had areas of yellowish-gray necrotic tissue, ordinarily indicative of the presence of adult lungworms.<sup>4</sup> In some instances the amount of necrotic lung tissue was substantial, and the well-being of the host almost certainly was impaired.

*Trichostrongylus* was found most com-

monly in the cecum; much smaller numbers were present in the large and small intestines. *Passalurus ambiguus* occurred most commonly in the cecum, where it was the most abundant parasite. It was present in considerably smaller numbers in the large intestine and occurred only occasionally in the small intestine. The rabbit whipworm, *Trichuris leporis*, was encountered most often in the cecum and was found in much lower numbers in the large intestine. None were recovered from the small intestine. The nematode occurring in smallest numbers in the gastrointestinal tract was *Nematodirus* sp. A total of 690 individuals was recovered, and 515 of these were present in a single hare. *Nematodirus* appeared to be largely confined to the small intestine. Only 13 were found in the cecum and none in the large intestine.

Because *Dirofilaria scapiceps* is found almost exclusively in the tarsal bursa,<sup>5</sup> or epiphyseal pocket, it was looked for only in that location. When present in considerable numbers, this parasite caused large lumps, consisting of the mass of parasites, which occupied the epiphyseal pockets of the hind legs and might have affected normal movement to some degree. During the summers of 1957 and 1958, blood smears from approximately 60 hares were examined for the presence of microfilariae; none were found.

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#### LITERATURE CITED

1. BOOKHOUT, T. A. 1965. Breeding biology of snowshoe hares in Michigan's Upper Peninsula. J. Wildl. Mgmt. 29: 296-303.
2. DODDS, D. G., and J. S. MACKIEWICZ. 1961. Some parasites and diseases of snowshoe hares in Newfoundland. J. Wildl. Mgmt. 25: 409-414.
3. ERICKSON, A. B. 1944. Helminth infections in relation to population fluctuations in snowshoe hares. J. Wildl. Mgmt. 8: 134-153.
4. GREEN, R. G., and J. E. SHILLINGER. 1935. Progress report of wildlife disease studies for 1934. Trans. Amer. Game Conf. 21: 397-401.
5. HIGBY, P. R. 1943. Vectors, transmission, development, and incidence of *Dirofilaria scapiceps* (Leidy, 1886) (Nematoda) from the snowshoe hare in Minnesota. J. Parasitol. 29: 253-259.
6. PHILIP, C. B. 1938. A parasitological reconnaissance in Alaska with particular reference to varying hares. II. Parasitological data. J. Parasitol. 24: 483-488.

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