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Research Note

Helminths from Some Minnesota and Wisconsin Raptors

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ABSTRACT: Seventy-seven hawks of 10 species (*Accipiter cooperii, Accipiter striatus, Accipiter gentilis, Circus cyaneus, Buteo lagopus, Buteo jamaicensis, Buteo platypterus, Pandion haliaetus, Falco peregrinus, Falco sparverius*) and 49 owls of 8 species (*Bubo virginianus, Strix nebulosa, Strix varia, Aegolius acadicus, Otus asio, Asio flammeus, Asio otus, Cryptoglaux funereus*) from Minnesota and Wisconsin were examined for helminths. *Echinoparyphium* sp., *Echinostoma trivolvis, Neodiplostomum* sp., *Ribeiroia thomasi, Strigea falconis* (Trematoda), *Capillaria* sp., *Cyrnae* sp., and *Porrocaecum* sp. (Nematoda) were common to both hawks and owls. *Paruterina* sp. (Cestoda) was found only in the great-horned owl. *Lyperosomum* sp., *Parastrigea* sp. (Trematoda), *Centrorhynchus spinosus* (Acanthocephala), *Contracaecum pandioni, Microtetrameres* sp., *Physaloptera* sp., *Serratospiculoides amaculata,* and *Tetrameres* sp. (Nematoda) were recovered from hawks. New host records include *Lyperosomum* sp. from the gall bladder of a kestrel and *Ribeiroia thomasi* from the proventriculi of great-horned owls and red-tailed and broad-winged hawks. The only instance of pathology was a tissue reaction to *S. amaculata* in the air sacs of a Cooper's hawk.

KEY WORDS: hawks, owls, Minnesota, Wisconsin, Acanthocephala, Cestoda, Nematoda, Trematoda, prevalence, pathology.

No recent studies of helminth parasites observed in Minnesota and Wisconsin raptors have been published. Chandler and Rausch (1947) and Dubois and Rausch (1948, 1950a, b) concentrated on strigeoids from the midwest. Morgan (1943, 1946, 1948) discussed nematode parasites. Rausch (1948) reported on cestode parasites from owls in North America. This paper presents information about helminths from 10 species of hawks and 8 species of owls obtained from Minnesota and Wisconsin.

Seventy-seven hawks of 10 species and 49 owls of 8 species were examined for helminth parasites. Five were fresh road kills collected by the authors in Wisconsin, and the remaining were obtained frozen from the Raptor Center of the University of Minnesota; the Northwoods Wildlife Rehabilitation Center, Minocqua, Wisconsin; Wisconsin Department of Natural Resources, Madison, Wisconsin; and Fran Hamerstrom, Plainfield, Wisconsin. Complete necropsies were performed on all remains.

All helminths, other than nematodes, were preserved in alcohol–formalin–acetic acid and stained in Semichon's carmine, dehydrated, and mounted in Canada balsam. Nematodes were cleared in glycerine alcohol and stored, or mounted on slides using the double coverslip method.

Selected specimens in good condition were deposited in the University of Nebraska State Museum, Harold W. Manter Laboratory Collection (HWML Coll.) as follows: HWML No. 35098, *Centrorhynchus spinosus* (Kaiser, 1893) Van Cleave, 1924, ex *Buteo platypterus*; HWML Nos. 35099, 35100, and 35101, *Ribeiroia thomasi* (McMullen, 1938) Yamaguti, 1958, ex *Pandion haliaetus, Buteo platypterus,* and *Bubo virginianus,* respectively; HWML No. 35102, *Parastrigea* sp. ex *Falco peregrinus*; HWML No. 35103, *Microtetrameres* sp. ex *Buteo lagopus*; HWML No. 35546, *Strigea falconis* Szidat, 1928, ex *Buteo platypterus*; HWML No. 35547, *Strigea falconis* ex *Buteo jamaicensis*; HWML No. 35548, *Neodiplostomum* sp. ex *Buteo jamaicensis*; HWML No. 35549, *Neodiplostomum* sp. ex *Accipiter striatus*; HWML No. 35550, *Neodiplostomum* sp. ex *Accipiter cooperi*; HWML No. 35551, *Strigea falconis* ex *Circus cyaneus*; HWML No. 35552, *Physaloptera* sp. ex *Accipiter striatus*; HWML No. 35553, *Contracaecum pandioni* Sobolev and Sudarikow, 1939, ex *Pandion haliaetus*; HWML No. 35554, *Serratospiculoides amaculata* Wehr, 1938, ex *Accipiter cooperi*; and HWML No. 35555, *Porrocaecum* sp. ex *Buteo jamaicensis.*

Prevalences of infections and ranges of numbers of worms found are given in Table 1 for hawks and Table 2 for owls.

Carcasses examined by us had usually been

Table 1. Prevalence of helminths in hawks from Minnesota and Wisconsin. Numbers in parentheses are ranges of worms per positive host. Goshawk (*Accipiter gentilis*, $N = 1$) was examined but found to be negative.*

	Cooper's hawk (*Accipiter cooperii*)	Sharp-shinned (*Accipiter striatus*)	Northern Harrier (*Circus cyaneus*)	Rough-legged (*Buteo lagopus*)	Red-tailed (*Buteo jamaicensis*)	Broad-winged (*Buteo platypterus*)	Osprey (*Pandion haliaetus*)	Peregrine (*Falco peregrinus*)	Kestrel (*Falco sparverius*)
Echinoparyphium sp.[1]						5/16 (1–169)			
Echinostoma trivolvis[1]					1/11 (1)	1/16 (37)			
Lyperosomum sp.[2]									1/9† (2)
Neodiplostomum sp.[1]	2/7 (20–39)	7/8 (1–20)	2/2 (3–12)		4/11 (4–41)	3/16 (1–5)			
Parastrigea sp.[1]						3/16 (1–6)		1/1 (4)	
Ribeiroia thomasi[3]					1/11† (1)	3/16† (1–27)	1/1 (21)		
Strigea falconis[1]	1/7 (6)	1/8 (3)	2/2 (1–9)	1/21 (5)	6/11 (20–87)	7/16 (2–5)			
Centrorhynchus spinosus[1]						2/16			
Contracaecum pandioni[4]							1/1 (4)		
Cyrnae sp.[3]	2/7 (1–2)	1/8 (1)	2/2 (3–31)			4/16 (1–16)			
Microtetrameres sp.[3]				1/21 (29)		1/16 (1)			1/9 (5)
Physaloptera sp.[4]		6/8 (3–5)		1/21 (1)		2/16 (4)			
Porrocaecum sp.[1]	3/7 (1–50)	1/8 (5)		2/21 (3)	5/11 (3–5)	6/16 (5–19)			
Serratospiculoides amaculata[5]	1/7 (27)								
Tetrameres sp.[3]									1/9 (5)

* Superscripts indicate location in host: 1 = intestine; 2 = gall bladder; 3 = proventriculus; 4 = stomach; 5 = air sacs.
† New host records.

frozen and in some cases refrozen. They exhibited slight to severe autolysis. Schoop et al. (1987) generally condemned the use of frozen hosts for parasitological surveys because trematodes and small cestodes are underrepresented and nematodes and acanthocephalans are overrepresented. The use of frozen hosts generally in poor condition made it difficult to identify parasites beyond the generic level. Pence et al. (1988) condoned the practice with certain caveats, especially when dealing with rare or endangered hosts. Raptors fit into this category. As a result, prevalence rates in Table 1 and 2 may be low, especially in regard to trematodes and cestodes. A thorough search of the raptor parasite literature was undertaken in order to compare numbers of helminths found by us to those reported by others. Comparisons proved difficult for the following reasons: only about one-half of the papers reported parasite numbers; when numbers were given they were often from different hosts; and some numbers reported were from helminth taxa differing from ours. Numbers and kinds of parasites found in our samples of great-horned owls are compared to those of Ramalingam and Samuel (1978), who also used frozen carcasses. They listed 13 genera, whereas species in 8 genera were found in our study. The studies had 7 genera and/or species in common (*Capillaria, Cyrnae, Echinoparyphium, Echinostoma revolutum, Pa-*

Table 2. Prevalence of helminths in owls from Minnesota and Wisconsin. Numbers in parentheses are ranges of worms per positive host. Great grey (*Strix nebulosa*, $N = 1$) and Screech (*Otus asio*, $N = 4$) owls were examined and found to be negative.*

	Great-horned (*Bubo virginianus*)	Barred (*Strix varia*)	Saw-whet (*Aegolius acadicus*)	Short-eared (*Asio flammeus*)	Long-eared (*Asio otus*)	Boreal (*Cryptoglaux funereus*)
Echinoparyphium sp.[1]	1/19 (67)					
Echinostoma trivolvis[1]	1/19 (8)					
Neodiplostomum sp.[1]	1/19 (7)	1/7 (22)				
Ribeiroia thomasi[2]	2/19† (1–8)					
Strigea falconis[1]	4/19 (3–23)	1/7 (1)				
Paruterina sp.		2/7 (7–19)				
Capillaria sp.[1]	2/19 (5–9)	2/7 (3–6)	1/8 (2)		1/3 (2)	
Cyrnae sp.[2]	4/19 (1–8)	2/7 (10–24)				
Porrocaecum sp.[1]	9/19 (1–6)	2/7 (1–10)		1/2 (1)	1/3 (5)	3/5 (2–16)

* Superscripts indicate location in host: 1 = intestine; 2 = proventriculus.
† New host records.

ruterina, Porrocaecum, and *Strigea*). Of the taxa in common, we report higher numbers only for the genus *Strigea.* The greater diversity and higher intensities of infection reported by them may simply reflect their sample size of 69 versus ours of 19.

Specimens of *Lyperosomum* sp. were collected from the gall bladder of a kestrel. Although a new host record, it should not be considered unusual because insects commonly make up a large part of the diet of these birds (Alcorn, 1934). Insects also serve as the second intermediate host for several members of the genus *Lyperosomum.*

Previously reported only in Cooper's hawk and ospreys, *R. thomasi* has now been recovered from great-horned owls, red-tailed and broad-winged hawks, and again from an osprey. The second intermediate hosts of this parasite are either fish or amphibians (Beaver, 1939), indicating a broad food base for these birds.

Newsom and Stout (1933) observed proventriculitis in chickens infected with *R. thomasi.* Proventriculitis was not observed in our study. The only instance of pathology in any of the birds was a tissue reaction in the air sacs of a Cooper's hawk due to the presence of 27 adult *Serratospiculoides amaculata.* Sterner and Espinosa (1988) reported *Serratospiculoides amaculata* from a Cooper's hawk and noted a similar tissue reaction surrounding the worms in the thoracic air sac. Ours is the second published report of a species of this genus from a Cooper's hawk.

The greatest diversity of parasites (Table 1) observed by us was found in the broad-winged hawks. According to Mosher and Palmer (1988), these hawks have some of the most diverse food habits among the raptors, feeding on invertebrates, fish, amphibians, reptiles, birds, and mammals.

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Research Note

Gastrointestinal Helminths of the Crevice Spiny Lizard, *Sceloporus poinsettii* (Phrynosomatidae)

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ABSTRACT: Twenty-one *Sceloporus poinsettii* from Texas and New Mexico were examined for helminths. Helminth faunas of the 2 lizard populations differed. The Texas population contained *Skrjabinoptera phrynosoma* (80% prevalence, mean intensity 27), *Thubunaea iguanae* (20% prevalence, mean intensity 1), and *Oochoristica scelopori* (30% prevalence, mean intensity 7). The New Mexico population contained *Physaloptera retusa* (55% prevalence, mean intensity 25) and *Spauligodon giganticus* (82% prevalence, mean intensity 30). All represent new host records. Xeric conditions of the Texas *S. poinsettii* habitat may partly account for the absence of *S. giganticus.*

KEY WORDS: *Sceloporus poinsettii,* Phrynosomatidae, Cestoda, *Oochoristica scelopori,* Nematoda, *Skrjabinoptera phrynosoma, Thubunaea iguanae, Physaloptera retusa, Spauligodon giganticus,* prevalence, intensity.

The crevice spiny lizard, *Sceloporus poinsettii* Baird and Girard, 1852, occurs from southern New Mexico and Texas to Zacatecas, Mexico, at elevations of 300–2,560 m (Stebbins, 1985). Gambino (1958) and Gambino and Heyneman (1960) previously reported the nematode *Atractis penneri* (Gambino, 1957) Baker, 1987, from *Sceloporus poinsettii.* The purpose of this note is to report 5 new host records: *Oochoristica scelopori* Voge and Fox, 1950, *Skrjabinoptera phrynosoma* (Ortlepp, 1922) Schulz, 1927, *Thubunaea iguanae* Telford, 1965, *Physaloptera retusa* Rudolphi, 1819, and *Spauligodon giganticus* (Read and Amrein, 1953) Skrjabin, Schikhobalova, and Lagodovskaja, 1960.