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Source: Journal of Wildlife Diseases, 14(1) : 97-101

Published By: Wildlife Disease Association

URL: <https://doi.org/10.7589/0090-3558-14.1.97>

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ECTO- AND ENDOPARASITES OF THE BLACK BEAR IN NORTHERN WISCONSIN

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Abstract: Parasites collected from free-ranging black bears, *Ursus americanus*, in northern Wisconsin included *Dermacentor variabilis*, *D. albipictus*, *Ixodes scapularis*, *Demodex* sp., *Trichodectes pinguis euartidos*, *Baylisascaris transfuga* and *Dirofilaria ursi*. Mange, possibly caused by the *Demodex* sp., also was observed. Dental caries were common and periodontal disease was observed in one animal.

INTRODUCTION

Relatively little is known of the parasites of black bears, *Ursus americanus*, in central and eastern North America. Published reports are limited to the results of a survey in northeastern Minnesota and northern Michigan,^{1,6} reports of *Dirofilaria ursi* in southern Ontario^{1,3} and northern Quebec,³ and reports of *Diphyllobothrium latum* in northern Minnesota.^{13,20} The only work on parasites of bears in Wisconsin was a survey for *Trichinella spiralis* by Zimmermann.²²

This is a report of parasites collected from black bears captured during 1974 and 1975 as part of a population and parasite study in northern Wisconsin (Ashland, Bayfield, Iron, Sawyer and Taylor counties) and from black bear viscera acquired from hunters in this same area during 1974 and 1975.

MATERIALS AND METHODS

Bears were anesthetized with a combination of phencyclidine hydrochloride[□] (1.1 mg/kg of body weight) and promazine hydrochloride[□] (0.55

mg/kg of body weight). Following anesthesia, a 3 mm³ tissue sample was excised from the Procaine-desensitized vastus externus/gastrocnemius area and microslides were prepared for later mite examination using standard histological techniques.⁷ Hair removed from the biopsy area was later examined for lice eggs. After Procaine desensitization, a P1 tooth was extracted for aging, and teeth and gums were examined for dental caries and periodontal disease, respectively.

Scabs were scraped or excised and later examined for mites. Two blood smears from each animal were examined for microfilariae. Ten ml of blood were removed from the femoral artery and later centrifuged at 2500 rpm for 10 min., to concentrate any microfilariae. Fecal samples were collected and stored in 10% formalin for examination later.

Ectoparasites were hand-collected from 95 bears live-trapped in northern Wisconsin during the summers of 1974 and 1975 and from 18 recaptures made in 1975. Fecal samples from 92 of these bears and the viscera from 28 hunter-

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[□] Sernylan. Bio-cetic Laboratories, Inc., St. Joseph, Missouri 64502, USA.

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killed bears were examined for helminths.

Fecal samples were prepared using the modified Sheather's sugar flotation technique,¹⁸ and diaphragm samples were examined for *T. spiralis* using a modification of Hill's⁹ method.

Parasites were placed in the parasitology collection, Department of Biology, College of Natural Resources, University of Wisconsin, Stevens Point.

RESULTS AND DISCUSSION

Dermacentor variabilis was found on 83 bears live-trapped in northern Wisconsin during the summers of 1974 and 1975. In 1974, 3 (33%) of 9 bears examined between 9 August and 13 October carried from 1 to 12 *D. variabilis*. In 1975, 21 (81%) of 26 individual captures and 35 (80%) of 44 total captures examined in the Clam Lake area (comprised of sections of Ashland, Bayfield and Sawyer counties) from 21 May to 11 August carried from 1 to approximately 1000 *D. variabilis*, with an average of 117 ticks per bear. From 7 May to 26 August 1975, 45 (75%) of 60 bears examined in Iron County carried from 1 to approximately 300 *D. variabilis*. Bears examined after 27 July 1975, were not infested with *D. variabilis*. Prior to this study, *D. variabilis* was reported from a black bear in Nova Scotia,⁵ and from bears in Michigan and Minnesota.¹⁶

D. albipictus was found on one bear captured 11 August 1975, in Ashland County. *D. albipictus* has been reported from black bears in Minnesota.¹⁶ Soulsby¹⁹ listed bears (species not given) as hosts of *D. albipictus*.

Ixodes scapularis was found on one bear captured on 6 August 1975, in Sawyer County. The black bear is a new host for *I. scapularis*, and its presence is a new record for Wisconsin.

Two *Demodex* sp. were recovered from scab tissue removed from a partially alopecic sow captured 13 June 1975. The scabs were dissolved in KOH according to the procedure described by Carpenter *et al.*² The mites were examined microscopically while in the KOH solution but were dissolved and lost in a pipette transfer. Tissue samples from 70 of the bears live-trapped during the summer 1975, were examined for *Demodex* but none was found. *Demodex* has not been reported in the black bear. Possibly the mite was responsible for the mange observed on five of the live-trapped bears.

Four bears captured in Iron County between 16 May and 30 June 1975, had moderate to heavy infestations of *Trichodectes pinguis euarctidos*. One of two heavily infested bears was a 2.5-year-old boar infested with approximately 5000 *T. pinguis euarctidos*; he weighed only 17.6 kg and was in poor physical condition. *T. pinguis euarctidos* has been reported from bears in Minnesota,¹⁶ Montana,^{11,21} British Columbia¹⁰ and Ontario.¹⁰

Dental caries were present in 9 (11%) of 86 bears captured in northern Wisconsin during 1975. One animal had extensive caries, but they were minimal in the remaining eight. Periodontal disease was observed in 1 (1%) of these 86 captures. An infection was noted behind both upper canines. Dental diseases are reported to be common in black bears, particularly among older animals.^{6,8}

Twenty-five (89%) of 28 intestinal tracts of bears obtained from hunters were infected with *Baylisascaris transfuga*. From 1 to 132 nematodes were found; portions of the duodenum from two tracts were completely occluded. One *B. transfuga* was removed from the anus of a sow captured on 11 July 1975, in Iron County.

Rausch¹⁴ and Choquette *et al.*⁴ presented evidence that helminths known to derive nourishment from chyme are lost prior to denning. Rogers¹⁶ observed a wild bear pass two adult *B. transfuga* on 9 September, 10 days before it denned. He also found specimens of *B. transfuga* in fecal droppings of bears on 6 and 16 October. In this study, intestinal tracts from bears shot on 19 and 20 October 1974, and one tract from a bear shot on 19 September 1975, were free of *B. transfuga*.

Of 92 fecal samples examined from bears live-trapped during the summers of 1974 and 1975, 59 (64%) had *B. transfuga* eggs. Rogers¹⁶ reported that *B.*

transfuga was a common parasite of black bears throughout their range in Canada and the northern United States. It has not been reported from the southern United States.¹⁷ In Minnesota, 5 (71%) of 7 intestinal tracts examined in the summer contained 1 to 4 *B. transfuga*.¹⁶

Twenty adult specimens of *Dirofilaria ursi* were found in the connective tissue around the aorta, kidneys and rectum of two bears. The blood of 17 (19%) of 90 individually captured bears from the summers of 1974 and 1975 contained microfilariae of this nematode. *D. ursi* is a common parasite in black bears throughout the northern United States^{11,12,16} and Canada.^{1,3} Rogers¹⁶

TABLE 1. Prevalence of parasites and disease in northern Wisconsin black bears, 1974 and 1975.

Parasite/disease	Number of bears		Percent infected
	examined	infected	
ECTOPARASITES			
<i>Dermacentor variabilis</i>	113	83	73
<i>Dermacentor albipictus</i>	113	1	1
<i>Ixodes scapularis</i>	113	1	1
<i>Demodex</i> sp.	113	1	1
<i>Trichodectes pinguis euarctidos</i>	113	4	4
ENDOPARASITES			
From the viscera			
<i>Baylisascaris transfuga</i>	28	25	89
<i>Dirofilaria ursi</i> adults	28	2	7
From the blood			
<i>Dirofilaria ursi</i> microfilariae	90	17	19
From the feces			
<i>Baylisascaris transfuga</i> eggs	92	59	64
hookworm larva	92	1	1
DISEASES			
dental caries	86	9	11
periodontal disease	86	1	1
mange and alopecia	113	5	4

found *D. ursi* adults and microfilariae in viscera from bears in Michigan and Minnesota.

Diaphragm samples from 28 hunter-killed bears were examined for *T. spiralis*, but none was found. Zimmer-

mann,²² however, found that 6 (4%) of 163 diaphragms from black bears in northern Wisconsin were infected. Cannibalism of bear carcasses has been suggested as a major factor in transmission of *T. spiralis* among bears.^{15,16}

Acknowledgements

The identifications of arthropods were confirmed by Marsha Lisitza of the Department of Entomology, University of Wisconsin, Madison, and the helminths by Stephen J. Taft of the College of Natural Resources, University of Wisconsin, Stevens Point, and by Laerte Grisi of the Department of Veterinary Science, University of Wisconsin, Madison.

Appreciation is expressed to the Wisconsin Department of Natural Resources for their supply of supportive parasite data from 66 bears live-trapped in 1974 and 1975. Appreciation is also expressed to Drs. Lyle E. Nauman, Neil F. Payne, Charley M. White, Stephen J. Taft and Daniel O. Trainer for reviewing this manuscript. A special note of appreciation is expressed to the hunters who provided viscera for this study. This project was funded by research grants to Lyle E. Nauman and Daniel O. Trainer, with some financial assistance from the Wisconsin Bear Hunters Association.

LITERATURE CITED

1. ANDERSON, R. C. 1952. Description and relationship of *Dirofilaria ursi* Yamaguti, 1941, and a review of the genus *Dirofilaria*. *Trans. Royal Can. Inst.* 29: 35-65.
2. CARPENTER, J. W., J. C. FREENY and C. S. PATTON. 1972. Occurrence of *Demodex* Owen 1843 on a white-tailed deer from Oklahoma. *J. Wildl. Dis.* 8: 112-114.
3. CHOQUETTE, L. P. E. 1952. *Dirofilaria desportesii* sp. nov., a filariid from the black bear in Canada. *Can. J. Zool.* 30: 344-351.
4. ———, G. G. GIBSON and A. M. PEARSON. 1969. Helminths of the grizzly bear, *Ursus arctos* L., in northern Canada. *Can. J. Zool.* 47: 167-170.
5. DODDS, D. G., A. M. MARTELL and R. E. YESCOTT. 1969. Ecology of the American dog tick, *Dermacentor variabilis* (Say), in Nova Scotia. *Can. J. Zool.* 47: 171-181.
6. ERICKSON, A. W. 1967. The black bear in Alaska — its ecology and management. Alaska Dept. Fish and Game, Juneau. 19 pp.
7. FRANKEL, S., S. REITMAN and A. C. SONNENWIRTH (eds.). 1970. *Gradwohl's Clinical Laboratory Methods and Diagnosis*. The C. V. Mosby Co., St. Louis. 1016 pp.
8. HALL, E. R. 1945. Dental caries in wild bears. *Trans. Kansas Acad. Sci.* 48: 79-85.
9. HILL, C. H. 1951. The recovery of encapsulated infective larvae of *Trichinella spiralis* relatively free of muscle tissue. *Proc. Helm. Soc. Wash.* 18: 114-120.
10. HOPKINS, G. H. E. 1954. Notes on some Mallophaga from bears. *Entomologist* 87: 140-146.

11. JONKEL, C. J., and I. M. COWAN. 1971. The black bear in the spruce-fir forest. Wildl. Monograph No. 27. The Wildl. Soc. 57 pp.
12. KING, J. M., H. C. BLACK and O. H. HEWITT. 1960. Pathology, parasitology and hematology of the black bear in New York. N.Y. Fish and Game J. 7: 79-111.
13. MAGATH, T. B. 1927. Experimental studies of *Diphyllbothrium latum*. Minn. Med. 10: 614-616.
14. RAUSCH, R. L. 1961. Notes on the black bear, *Ursus americanus* Pallas, in Alaska, with particular reference to dentition and growth. Z. Säugetier Bd. 26, H. 2: 65-128.
15. ———. 1970. Trichinosis in the Arctic. In: *Trichinosis in Man and Animals*. S. E. Gould, ed. Charles C. Thomas, Springfield, Ill. 540 pp.
16. ROGERS, L. L. 1975. Parasites of black bears of the Lake Superior region. J. Wildl. Dis. 11: 189-192.
17. ———, and S. ROGERS. 1976. Parasites of the Ursidae: a review. In: *Bears — Their Biology and Management*. Pelton, M. R., G. E. Folk, and J. W. Lentfer, eds. Proc. 3rd Int. Conf. on Bear Res. and Manage., IUCN, Morges, Switz. 467 pp.
18. SLOSS, M. W. 1972. *Veterinary Clinical Parasitology*. Iowa State Univ. Press, Ames. 250 pp.
19. SOULSBY, E. J. L. 1968. *Helminths, Arthropods and Protozoa of Domesticated Animals*. The Williams and Wilkins Co., Baltimore. 824 pp.
20. VERGEER, T. 1930. Causes underlying increased incidence of broad tapeworm in man in North America. J. Am. med. Ass. 95: 1579-1581.
21. WORLEY, D. E., J. C. FOX, J. B. WINTERS, R. H. JACOBSON and K. R. GREER. 1976. Helminths and arthropod parasites of grizzly and black bears in Montana and adjacent areas. In: *Bears — Their Biology and Management*. Pelton, M. R., G. E. Folk, and J. W. Lentfer, eds. Proc. 3rd Int. Conf. on Bear Res. and Manage., IUCN, Morges, Switz. 467 pp.
22. ZIMMERMANN, W. J. 1975. Unpublished study of trichinosis in black bear in Michigan and Wisconsin. In: *Parasites of the Black Bear in the Lake Superior Region*. L. L. Rogers. J. Wildl. Dis. 11.

Received for publication 15 April 1977