

Parasites of black bears of the Lake Superior region.

L L Rogers

Journal of wildlife diseases (Impact Factor: 1.27). 05/1975; 11(2):189-92.

DOI: 10.7589/0090-3558-11.2.189-92

Source: PubMed

ABSTRACT Parasites collected from free-ranging black bears, *Ursus americanus* Pallas, 1780, from northeastern Minnesota or northern Michigan include the dog tick, *Dermacentor variabilis* (Say, 1821), the winter tick, *D. ALBIPICTUS* (Packard, 1869), a louse, *Trichodectes pinguis euarctidoes* Hopkins, 1954, an ascarid worm, *Baylisascaris transfuga (rudolphi, 1819)*, a filarial worm, *Dirofilaria ursi* Yamaguti, 1941, taeniid tapeworms, and unidentified fleas. The broad fish tapeworm, *Diphyllobothrium latum* (Linnaeus, 1785), was reported to be common in man and black bears in northeastern Minnesota earlier in this century, but now it apparently is uncommon in black bears in northern Wisconsin. Cannibalism of carcasses is common in the black bear and may play a major role in the transmission of *Trichinella*.

PARASITES OF BLACK BEARS OF THE LAKE SUPERIOR REGION

LYNN L. ROGERS, Bell Museum of Natural History, University of Minnesota, Minneapolis 55455, U.S.A.

Abstract: Parasites collected from free-ranging black bears, *Ursus americanus* Pallas, 1780, from northeastern Minnesota or northern Michigan include the dog tick, *Dermacentor variabilis* (Say, 1821), the winter tick, *D. albipictus* (Packard, 1869), a louse, *Trichodectes pinguis euarctidoes* Hopkins, 1954, an ascarid worm, *Baylisascaris transfuga* (Rudolphi, 1819), a filarial worm, *Dirofilaria ursi* Yamaguti, 1941, taeniid tapeworms, and unidentified fleas. The broad fish tapeworm, *Diphyllobothrium latum* (Linnaeus, 1758), was reported to be common in man and black bears in northeastern Minnesota earlier in this century, but now it apparently is uncommon or absent in both species. *Trichinella spiralis* (Owen, 1835) recently was found in black bears in northern Wisconsin. Cannibalism of carcasses is common in the black bear and may play a major role in the transmission of *Trichinella*.

INTRODUCTION

This paper reports parasites collected during population studies of black bears in Upper Michigan during 1968 and in northeastern Minnesota from 1969 through 1974. Little is known of the parasites of black bears (*Ursus americanus* Pallas, 1780) from the central portion of North America. Published literature from that area apparently is limited to reports of filarial worms, *Dirofilaria ursi* Yamaguti, 1941, from southern Ontario^{1,2} and a report of broad fish tapeworms, *Diphyllobothrium latum* (Linnaeus, 1758), from northern Minnesota.³

MATERIALS AND METHODS

Ectoparasites were collected from 13 bears live-trapped in Michigan and Minnesota. Additionally, 962 fecal droppings and nine intestinal tracts from bears in Minnesota were examined macroscopically for helminths. Arthropods were identified by Edwin F. Cook or Roger Price and deposited in the collection of the Department of Entomology at the University of Minnesota at St. Paul. Helminths were identified by Henry Griffiths and deposited in the collection

of the Animal Parasitology Institute at Beltsville, Maryland.

RESULTS AND DISCUSSION

Dog ticks, *Dermacentor variabilis* (Say, 1821), were collected from bears in both Michigan and Minnesota. In Minnesota, 10 (56%) of 18 bears examined between 28 May and 24 July carried from 1 to approximately 65 *D. variabilis*, but only one bear of 22 captured between 2 August and 11 October and none of eight adults in dens in March carried *D. variabilis*. However, one of the eight adults examined in March had at least 30 winter ticks, *D. albipictus* (Packard, 1869). Two 2-month-old cubs in the den with the infested bear were free of ticks. *D. variabilis* previously was reported from a black bear in Nova Scotia.⁴ Soulsby⁵ listed bears (species not given) as hosts for *D. albipictus* but did not indicate the source of the information.

An adult male bear killed near Marquette, Michigan, on 20 June 1968 carried lice (*Trichodectes pinguis euarctidoes* Hopkins, 1954), ticks (*Dermacentor variabilis*), and numerous fleas. The latter were lost before they could be identified to genus. Previous reports of

fleas on bears in North America have been limited to the northwestern portion of the continent,^{6,16} with the southeasternmost records being from Montana.^{6,16,17} No fleas were reported from 306 wild black bears in New York.¹⁸ Lice, *Trichodectes pinguis cuarctidos*, apparently are more widespread, having been reported from black bears in New York,¹⁹ Ontario,⁵ British Columbia,⁵ and Montana.^{6,20}

Adult specimens of a filarial worm, *Dirofilaria ursi* Yamaguti, 1941, were found in the connective tissue and peritoneal cavities of bears from Michigan and Minnesota. Microfilariae (larvae of *Dirofilaria*) were found in the blood of each of 47 bears examined in Minnesota from April through September (L. L. Rogers and U. S. Seal, unpublished manuscript). *D. ursi* is found in bears throughout the northern United States^{11, 14, 21} and Canada.^{1, 2, 4, 19}

Seven intestinal tracts were examined in Minnesota in the summer. Five of them contained one to four ascarid worms, *Baylisascaris transfuga* (Rudolphi, 1819). This parasite is found throughout the range of the black bear in Canada and the northern United States, although it apparently has not been reported from the southern United States.¹⁶ Two of the tracts contained two to four taeniid cestodes. Due to poor preservation and the small number of specimens, positive identifications could not be made; however, the cestodes from one of the tracts tentatively were identified as *Multiceps serialis* Gervais, 1847, which apparently has not been reported previously from a bear.¹⁶ Carcasses of the usual intermediate host of *M. serialis* in Minnesota, the snowshoe hare (*Lepus americanus* Erxleben, 1777),¹¹ were numerous along roadsides during this study and were observed to be scavenged by bears. Previous reports of taeniid cestodes in bears in North America have been limited to the northwestern portion of the continent with the southeasternmost records being from Colorado⁷ and Montana.^{8, 20}

Two intestinal tracts from denning bears that died on 24 November and 20 March were examined. Both appeared to be free of helminths. Rausch^{13, 14} and Choquette *et al.*² presented evidence that intestinal helminths that derive nourishment from ingested materials are lost prior to denning. In this study, a free-ranging black bear was observed to pass two adult *B. transfuga* on 9 September, ten days before it denned. Two additional specimens of *B. transfuga* were found in droppings from other bears on 6 and 16 October. These were the only helminths found in 562 droppings examined between April and November.

The absence of strobilae of *Diphyllobothrium* Cobbold, 1858, in fecal droppings was striking because bears infected with this genus are known to pass large numbers of strobilae in autumn^{12, 14} and because *D. latum* was reported as common in man and black bears in northeastern Minnesota during the early 1900's following its introduction by immigrating Finlanders.^{12, 14} Subsequent improvements in sewage systems and proper cooking of fish, an intermediate host of *D. latum*, apparently led to a decline in the incidence of this cestode in man;²² no case of *D. latum* infection has been reported to the Minnesota Department of Public Health in the last 35 years.²³ Apparently *Diphyllobothrium* also has declined in bears.

Zimmerman²⁴ recently found *Trichinella spiralis* (Owen, 1835) in 6 (3.8%) of 163 diaphragms of black bears in northern Wisconsin, demonstrating that trichinosis bears are present in the Lake Superior Region. There has been considerable discussion concerning the means by which *Trichinella* infection is perpetuated in bear populations.^{10, 15, 19} Observations in this study give support to the hypothesis that cannibalism of carcasses is a major factor in the transmission of *Trichinella* in bears. Twelve (92%) of 13 carcasses of black bears were cannibalized, often by more than one bear.

† Finkelstein, S., 1974, personal communication.

‡ Zimmerman, W. J., 1974, personal communication.

Acknowledgements

Appreciation is expressed to Steven G. Wilson, Louis Verme, David W. Reimann, Leon Konz, Elsworth Harger, James Rice, Roger Bjork, and David Buetow for their assistance in the collection of data. Appreciation is expressed to Elmer C. Birney, L. David Mech, Henry Griffiths, and John Schlothauer for reviewing the manuscript. This work was funded by the WM Foundation, the National Rifle Association, the Big Game Club, the American Forestry Institute, the Boone and Crockett Club, the Wildlife Management Institute, the American Petroleum Institute, the Minnesota Department of Natural Resources, the United States Forest Service, the Minnesota State Archery Association, the Fergus Falls Fish and Game Club, the Northern Minnesota Sportsmen's Association, and Project W-70-R of the Federal Aid to Wildlife Restoration Program.

LITERATURE CITED

1. ANDERSON, R. C. 1952. Description and relationships of *Dirofilaria ursi* Yamaguti, 1941, and a review of the genus *Dirofilaria* Railliet and Henry, 1911. *Trans. Royal Can. Inst.* 29 (2): 35-65.
2. CHOQUETTE, L. P. E. 1952. *Dirofilaria desportesi* sp. nov., a filariid from the black bear in Canada. *Can. J. Zool.* 30: 344-351.
3. CHOQUETTE, L. P. E., 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.
4. 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.
5. HOPKINS, G. H. E. 1954. Notes on some Mallophaga from bears. *The Entomologist*. 87 (1094): 140-146.
6. HOPKINS, G. H. E. and M. ROTHSCHILD. 1956. An illustrated catalogue of the Rothschild Collection of Fleas (Siphonaptera) in the British Museum. The Trustees of the British Museum, London.
7. HORSTMAN, B. M. 1949. A survey of parasites of the black bear in southwestern Colorado. Unpublished M.S. thesis, Colorado A & M. Fort Collins.
8. HUBBARD, C. A. 1947. *Fleas of Western North America*. The Iowa State College Press, Ames.
9. JONKEL, C. J. and I. McT. COWAN. 1971. The black bear in the spruce-fir forest. *Wildl. Monogr.* No. 27.
10. KING, J. M., H. C. BLACK and O. H. HEWITT. 1960. Pathology, parasitology, and hematology of the black bear in New York. *New York Fish and Game J.* 7: 99-111.
11. LEIBY, P. D. and W. G. DYER. 1971. Cyclophyllidean tapeworms of wild Carnivora. Pp. 174-234 in J. W. Davis and R. C. Anderson, eds. *Parasitic Diseases of Wild Mammals*. Iowa State University Press, Ames, 364 pp.
12. MAGATH, T. B. 1927. Experimental studies on *Dipyllobothrium latum*. *Minnesota Med.* 10: 614-616.
13. RAUSCH, R. L. 1954. Studies on the helminth fauna of Alaska. XXI. Taxonomy, morphological variation, and ecology of *Dipyllobothrium ursi* n. sp. provis. on Kodiak Island. *J. Parasit.* 40: 540-563.
14. RAUSCH, R. L. 1961. Notes on the black bear, *Ursus americanus* Pallas, in Alaska, with particular reference to dentition and growth. *Z. Saugetierk.* Bd. 26, H. 2: 65-128.
15. RAUSCH, R. L. 1970. Trichinosis in the Arctic. Pp. 348-373 in S. E. Gould, ed. *Trichinosis in Man and Animals*. Charles C. Thomas, Springfield, Ill.

16. ROGERS, L. L. and S. ROGERS. 1975. Parasites of bears: a review. In M. R. Pelton, G. E. Folk, J. W. Lentfer, eds. *Bears—Their Biology and Management: Proc. 3rd Int. Conf. on Bear Res. and Mgmt.* IUCN, Morges, Switz. (in press).
17. SOULSBY, E. J. L. 1968. *Helminths, Arthropods, and Protozoa of Domesticated Animals*, 6th ed. The Williams and Wilkins Company, Baltimore.
18. VERGEER, T. 1930. Causes underlying increased incidence of broad tapeworm in man in North America. *J. Am. Med. Ass.* 95: 1579-1581.
19. WORLEY, D. E., J. C. FOX and J. B. WINTERS. 1974. Prevalence and distribution of *Trichinella spiralis* in carnivorous mammals in the United States Northern Rocky Mountain Region. In C. W. Kim, ed. *Trichinellosis: Proc. 3rd Int. Conf. on Trichinellosis*. Intext Press, N.Y., N.Y. (in press).
20. WORLEY, D. E., J. C. FOX, J. B. WINTERS, R. H. JACOBSON and K. R. GREER. 1975. Helminth and arthropod parasites of grizzly and black bears in Montana and adjacent areas. In M. R. Pelton, G. E. Folk, J. W. Lentfer, eds. *Bears—Their Biology and Management: Proc. 3rd Int. Conf. on Bear Res. and Mgmt.* IUCN, Morges, Switz. (in press).

Received for publication 3 June 1974