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A SURVEY OF TRICHINOSIS AMONG BLACK BEARS OF ARIZONA

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Abstract: Tongue samples were collected from 51 hunter-killed black bears (*Ursus americanus*) in Arizona during 1978 and 1979. *Trichinella* sp. was detected in 3.9% of this sample. Counts of 132 and 406 trichinae indicated a potential health hazard to anyone consuming insufficiently-cooked bear meat.

INTRODUCTION

Trichinella sp. has the widest host range of any of the helminths. Trichinae have been detected in man, domestic animals and wildlife. Zimmermann¹⁹ listed 104 wildlife reservoirs for this disease. Species of the order Carnivora made up 56% of this total. Since this disease is transmitted primarily by the ingestion of infected flesh, although fecal and mechanical transmission have been demonstrated experimentally,^{9,10,18} this high prevalence of infection in carnivores and omnivores is not surprising. These animals rely on predation or scavenging to obtain the animal protein required to meet their nutritional requirements.

Bears are prime examples of animals which run a high risk of contracting *Trichinella* sp. due to their opportunistic feeding behavior. They will readily scavenge an animal carcass and, if the need arises, they also can become a predator or cannibal.^{2,5,7,13} In addition to this natural source of infection, bears may coinhabit areas with man which might potentially expose them to this infection from infected meat scraps in open garbage dumps or garbage baits put out by hunters to attract bears.²⁰ However, considering the low prevalence of trichinosis in domestic animals, instances of bears becoming infected from such sources should be rare.

Trichinae has been described in all 3 species of North American bears. Rausch

*et al.*¹¹ found *T. spiralis* in polar bears (*Ursus maritimus*) and grizzly bears (*Ursus arctos*) in Alaska. Worley *et al.*¹⁷ also found trichinae in grizzlies in the northern Rocky Mountains. The parasite has been found in black bears (*Ursus americanus*) from Alaska,¹¹ New York,⁶ Pennsylvania, Vermont, West Virginia,⁴ Wisconsin, California, Idaho,²⁰ and the northern Rocky Mountain area.¹⁷ Sampling for trichinosis infections has also been conducted on black bear populations in Maine, New Hampshire,⁴ Colorado, Michigan, Minnesota, New Mexico, Oregon and Wyoming,²⁰ but no infections were found.

Trichinella sp. has never been described in black bears from Arizona. Zimmermann²⁰ examined 4 animals during his work in 1970-1971, but all were negative. He admitted, however, that this sample was very small and did not prove that the infection did not occur in the state. Since trichinosis in man, caused by eating improperly prepared bear meat, has been documented in Alaska,⁸ British Columbia,¹⁴ California, Idaho,¹⁶ Saskatchewan,³ and Vermont,¹² this study was initiated in 1978 to obtain a larger sample size to better assess and evaluate public health significance of the infection.

METHODS

This study was conducted during September of 1978 and 1979. Tongue samples were collected by Arizona Game

and Fish Department personnel from bears taken by hunters. Approximately half the tongue was collected from each bear. Samples were placed in numbered plastic bags containing boric acid powder. The hunter's name and address, date bear was shot, estimated age, sex, and area where taken were also recorded for each sample on a numbered card. Bags and information cards were mailed immediately to the Veterinary Medical Research Institute, Iowa State University. The artificial digestion-Baermann technique¹⁹ was used for diagnostic purposes.

Age of each bear was determined from counts of dental cementum annuli.¹⁵ A first premolar was extracted, placed in a tissue capsule, and given the same number as the tongue sample. Tooth samples were sectioned, stained and read at the Arizona Game and Fish Department Game Research Laboratory.

RESULTS AND DISCUSSION

During the 2 years of this study, a total of 51 tongue samples was collected (23 ♂, 24 ♀, 4 unknown). All 21 samples collected in 1978 were negative, but trichinae were discovered in 2 of 30 (7%) samples obtained in 1979. One was from

a 7.5 year old male taken north of Payson in central Arizona, and the other was from a 3.5 year old male taken on the San Carlos Indian Reservation in the east-central portion of the state. This 3.9% infection rate is similar to that in many states where infection in bears has been detected. The intensity of infection, as determined by trichinae per gram counts, was 406 for the Payson bear and 132 for the San Carlos animal. Both are in excess of the 1 trichinae per gram generally considered capable of inducing clinical trichinosis in man²⁰ and were higher than infection levels found in bears by other investigators.^{17,20} This indicates that a potential health hazard exists for anyone consuming insufficiently cooked bear meat.

The source of these infections is unknown. Certainly, as evidenced by the existence of infection in bear populations that have little or no contact with man,¹¹ trichinae occurs naturally in some bear populations due to cannibalism or feeding on infected carcasses of other species and can never be eradicated. It is, therefore, recommended as a precaution against human infection that all bear meat from Arizona be cooked as required for ready-to-eat pork products by the U.S. Department of Agriculture.

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LITERATURE CITED

1. BABBOTT, F.L. and B.W. DAY, JR. 1968. A survey of trichinosis among black bears of Vermont. *Environ. Health* 16: 900-902.
2. BEECHAM, J.J. 1980. Some population characteristics of two black bear populations in Idaho. In: *Bears — Their Biology and Management*. C.J. Martinka and K.L. McArthur, eds. U.S. Government Printing Office.
3. EMSON, H.E., M.A. BALTZAN and H.E. WIENS. 1972. Trichinosis in Saskatchewan — an outbreak due to infected bear meat. *Can. Med. Ass. J* 106: 897-901.

4. HARBOTTLE, J.E., D.K. ENGLISH and M.G. SHULTZ. 1971. Trichinosis in bears in northeastern United States. HSMHA Health 86: 473-476.
5. JONKEL, C.J. and I. McT. COWAN. 1971. The black bear in the spruce-fir forest. J. Wildl. Manage. Mono. 27. 57 pp.
6. 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.
7. LE COUNT, A.L. 1980. Characteristics of a central Arizona black bear population. Manuscript, Arizona Game and Fish Department, Phoenix.
8. MAYNARD, J.E. and F.P. PAULS. 1962. Trichinosis in Alaska. Am. J. Hyg. 76: 252-261.
9. MERKUSHEV, A.V. 1955. Concerning the rotation of *Trichinella* invasions in nature and their natural foci. Med. Parazitol. Parazitarn. Bolezni 2: 125-130.
10. NEGROBOV, W.P. 1960. On the role of necrophagous insects in formation of trichinellosis nidi. Trans. III Konferencii Parazitol. Ukr. SSR. pp. 180-181.
11. RAUSCH, R., B.B. BABRO, R.V. RAUSCH and E.L. SCHILLER. 1956. Studies on the helminth fauna of Alaska, XXVII. The occurrence of larvae of *Trichinella spiralis* in Alaskan mammals. J. Parasit. 42: 259-271.
12. ROSELLE, H.A., D.T. SCHWARTZ and F.G. GEER. 1965. Trichinosis from New England bear meat. New Engl. J. Med. 272: 304-305.
13. SCHLEGEL, M.W. 1976. Factors affecting calf elk survival in North Central Idaho. A Progress Report. Western Association of State Game and Fish Commissioners, Sun Valley, Idaho: 342-355.
14. SCHMITT, N., E.J. BOWMER, P.C. SIMON, A.J. ARNEAL and D.A. CLARK. 1972. Trichinosis from bear meat and adulterated pork products: a major outbreak in British Columbia, 1971. Can. Med. Ass. J. 107: 1087-1091.
15. STONEBERG, R.P. and C.J. JONKEL. 1966. Age determination of black bears by cementum layers. J. Wildl. Manage. 30: 411-414.
16. WAND, M. and D.L. LYMAN. 1972. Trichinosis from bear meat. J. Am. med. Ass. 220: 245-246.
17. WORLEY, D.E., J.C. FOX, J.B. WINTERS and K.R. GRIER. 1974. Prevalence of distribution of *Trichinella spiralis* in carnivorous mammals of the United States northern Rocky Mountain region. In: *Trichinellosis*. C.W. Kim, ed. Intext Educational Publishers, New York, N.Y.
18. ZIMMERMANN, W.J., E.D. HUBBARD and J. MATHEWS. 1959. Studies of fecal transmission of *Trichinella spiralis*. J. Parasit. 45: 441-445.
19. ———. 1971. Trichinosis. In: *Parasitic Diseases of Wild Mammals*. J.W. Davis and R.C. Anderson, eds. The Iowa State Univ. Press, Ames.
20. ———. 1977. Trichinosis in bears of western and northcentral United States. Am. J. Epidemiol. 106: 167-171.

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